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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 per year. Single Copy, 35¢. Annual Review Number, $2.00.

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Cable Address, "Ironage" N. Y.

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A PLATINUM-ALLOY bar with two scratches 1 meter apart was again on display to visitors last month in Paris. It's not a sight to quicken the pulse, and hardly competitive with other Parisian indulgences. However, those two scratches were the original foundation for some semblance of order in world measurement. One man's centimeter or inch became identical with another man's centimeter or inch, and the common standard introduced sense into commercial transactions and statistical records.

What the economists and statisticians in this country need are two scratches on a dollar to measure constant value. Every day brings forth a new analysis of the country's economy, a new comparative figure on production, a new figure on inventories—all expressed in dollars. The almighty dollar has unfortunately been somewhat rubbery for a decade or so, with quite a bit of stretch the past 12 months. So, as the casual reader struggles through the latest economic pronouncements with their neatly tabulated comparisons in dollars, he's not quite sure whether a smile or grimace is the proper facial expression. The quandary is something like Rita Hayworth asking whether the description of herself as "Mello-Rooney, Viddle-de-vop" is good or bad.

No one expects the economists to do anything about the instability of the dollar. Maybe no one can. That's a pretty complicated affair, bound up in governmental creation of credit, supply of money, rate at which people and businesses spend their money, the rate and the efficiency of production, and tax policies. But at least the economists should get together to establish a "standard dollar," and by mutual consent write their reports in terms of this "standard dollar."

The U. S. Department of Labor's Consumer Price Index has certain weaknesses, but its use as a "standard dollar" would be better than the wide-open affair that now prevails. Production figures appearing in the newspapers frequently change hue when weighted with this index.

For instance, 1946 national income is estimated at $165 billion, a new record high—but, properly weighted, the 1946 national income becomes the poorest since 1942. Or, the Department of Commerce announces that 1946 gross national product is $190 billion, which is some 58 pct above the $120 billion for 1941. But, properly weighted, the 1946 gross national product is only about 12 pct above the last prewar year. The same types of conversions can be made for all the multitude of figures released for inventory accumulations, net incomes of companies, purchases of manufacturing equipment, and the many other squiggles in the curves which graph the pulse of the country.

Economists certainly know better. In their private analyses they're realists enough to make proper adjustments. But this constant dishing out of phony comparative statistics only makes the public dizzy—they'd like to know whether they're dizzy from going up or from coming down!

T. W. Lippert

How to Lower The Machine-Side Cost of Steel

Steel is a low cost large tonnage product when compared with other metals. But the net cost delivered alongside your machinery and equipment varies greatly in different plants depending upon the mill methods of packing and shipping—and the manufacturers' methods of receiving and handling.

The preservation of quality is still another factor in final machine-side delivery. For these reasons Inland packing and shipping experts are always studying and trying new and better methods that will not only protect the quality but lower the delivered cost of steel.

They are also glad to work on your particular problems—determining the method of transportation; type of cars or trucks required; sizes of lifts or packages; protection needed for material in transit; methods of unloading; character and capacity of unloading and handling equipment... all important factors in net costs of delivered steel.

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► It appears that a wave of counter suits by companies charging employees with slowdowns, quitting early to wash up and similar practices is on its way to meet the flood of union-instituted portal to portal suits. When the two meet, the walking time claims may be somewhat washed out.

► Railroad men maintain that the 15-pct increase in freight rates for hauling perishables will not cover the cost of icing, labor and incidentals. More mechanical refrigeration appears to offer the only solution to the economics of this problem.

► An idea of future practice and policy of the communist-dominated labor unions in the United States may be secured by a study of Toledano, the Mexican labor leader. Toledano, who has personally visited Moscow, is highly regarded by many labor groups in Latin America and some of his ideas appear to be seeping across our southern border.

► The majority of American business executives look for a bright future for the first 6 months of 1947. This sanguine view is not shared by some leaders in the fields of general industrial machinery, machine tools and railroad equipment, according to a survey by the National Industrial Conference Board.

► It is rumored that French interests have ordered 16 19-knot completely refrigerated ships capable of carrying perishables, including frozen foods. It is said that they will operate in the Mediterranean with particular emphasis on Moroccan and Algerian ports, all of which should mean a growing market there for refrigeration and allied equipment.

► CPA has increased the percentage of natural rubber which may be used in making small and medium size passenger car tires from 13 to 23 pct. Large passenger tires may now be built of 67 pct natural rubber.

► With a piece of copper bell wire and an alcohol lamp it is possible to make a simple test for the presence of carbon tetrachloride vapor, which indicates its presence in a volume of more than 5 parts per million by a slight but unmistakable green color.

► The life of 14ST aluminum alloy can be substantially increased by shot peening. Tests on unnotched specimens show that life can be increased as much as 80 times and gains of 32 pct at 100 million stress reversals have been recorded for notched samples. This proof of the value of shot peening is considered indicative and encouraging but the figures should not be considered definite and specific at present.

► American steel men, returning from visits to plants in Sweden, Germany and the United Kingdom, report that American methods used in the manufacture of tool and fine steels are no more efficient than those now used abroad. However, wages in the iron and steel industry abroad are substantially less than half those paid in this country.

► Increasing interest is being shown in the use of carbon linings in blast furnaces as a means of increasing time between shutdowns. Twelve blast furnaces in this country are now operating with carbon linings, with new installations planned for eight additional furnaces.

► The Norwegians have 1,285,000 tons of shipping on order with Swedish shipyards. In contrast with the dearth of business in American yards Swedish shipbuilders estimate that they have enough orders on hand to keep them busy until 1950.

► Successful fabrication of stainless clad automobile bumpers and other accessories of stainless clad steel is claimed by Jessop Steel Co., Washington, Pa. Up to now chromium plated steel has been used for most of these parts.

► The next appearance of the steam turbine on rails will be the three turbine-electric locomotives for the Chesapeake & Ohio Ry. Each of these locomotives, which are expected to enter service this year, has a single 6000-hp steam turbine geared to two dc generators which supply power to eight axle-hung motors in the manner commonly employed on diesel-electric locomotives.

► Eleven firms in the United States Zone in Germany now are reducing United States and German scrap aluminum to pig form, according to a Military Government cable to the War Dept.

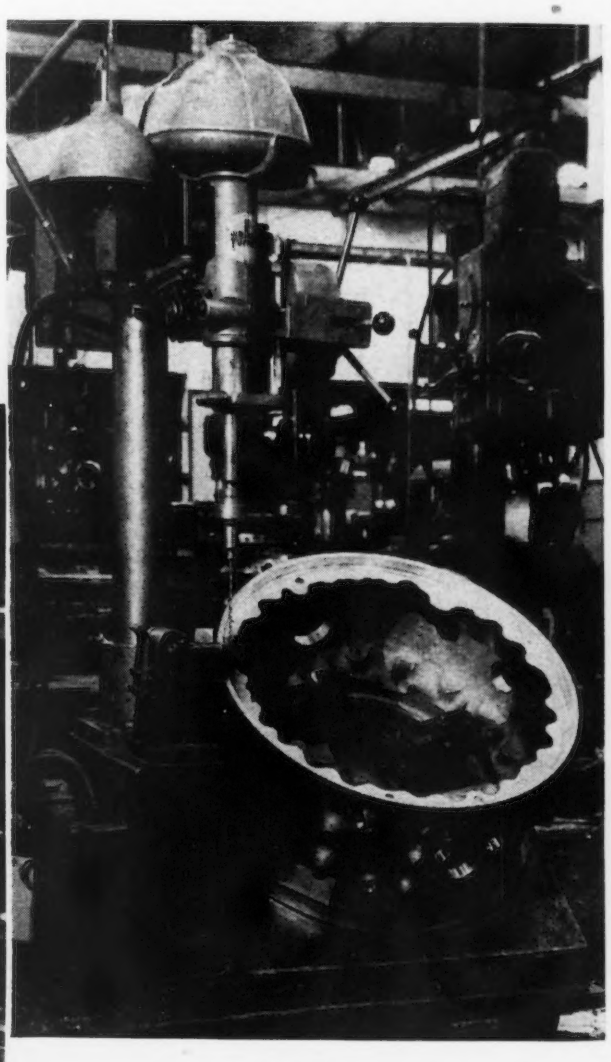
Jig Drills Reduce Capital Outlay,

SIMPLIFICATION of production methods is an eternal target for production men. The ingenuity of the craftsman and the tool designer constantly produces new machines and processes to speed output and reduce costs without sacrificing quality of product in any way.

In fact, many labor and time saving devices have proved more efficient than their more complicated and slow-but-sure predecessors. An example of the continuous progress being made in the improvement of production procedures may be seen at the Wright Aeronautical Corp.'s aircraft engine building plant at Wood-Ridge, N. J., where use of expensive radial drills has been discontinued in favor of a number of small individual jig-drill combinations in certain production operations. One of the arresting features of the present arrangement is the factor of reduced cost of equipment—installation of a series of $100.00 units employing standard power drills in place of the previous giant radial drills costing approximately $9,000.00 each.

Certain housing sections of a Wright Cyclone engine requires hundreds of holes of various depths, diameters and angles. The accuracy demanded in the drilling and location of these holes is held to tolerances as low as ±0.001 in. Accomplishment of this job, while staying within the prescribed limits, calls for specified machine tools and highly skilled operators.

Prior to the inception of the present method, a wartime development, the hole drilling operation was performed by a standard radial drill in the hands of an experienced machinist. The job was accomplished on a single machine but required considerable time. For



ABOVE

FIG. 2—In this installation a stationary type head is satisfactory, since there is ample room for loading and unloading.

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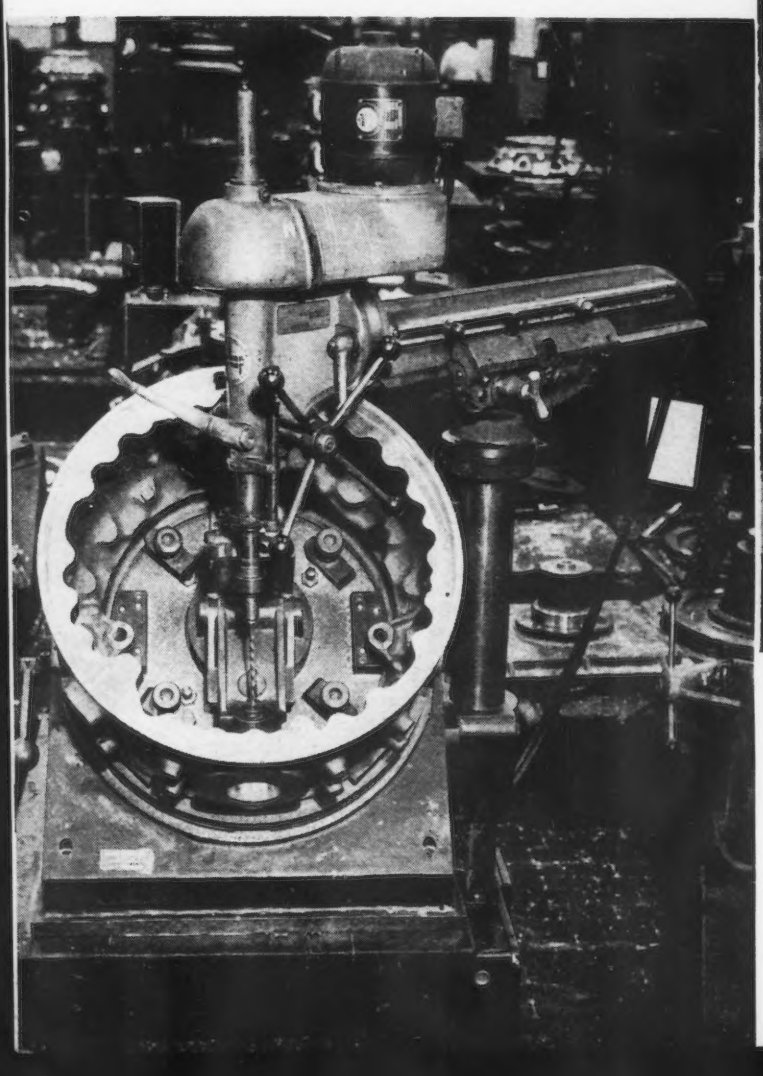

LEFT

FIG. 1—Use of a radial type drill head for drilling four oil passages on the inside of a nose section is dictated by the necessity of swinging the head out of the way to remove the workpiece.

Eliminate Setup Time

By E. PRANGE
Mgr., Tool Engineering, Wright Aeronautical Corp., Wood-Ridge, N. J.

Originally designed to offset the critical wartime shortage of radial drills, an ingenious method of combining small standard drill heads with the drill jigs is described herein. Designated as jig drills, these inexpensive units are ideal for relatively light work, and in addition to requiring a very much smaller capital outlay, eliminates the setup time formerly required.

each set of holes of different angle, location or other variation it was necessary to change jigs and fixtures and all but break down and set up the machine several times for drilling each part completely. Production schedules allowed as much as 30 pct of total operation time for this setup procedure, an indication of the recognized amount of time lost—lost in the sense that it was not directly productive.

To overcome this costly expenditure of time, tool engineers designed a series of individual jig units, each equipped with one or more standard drill units. On some of these jigs the power head is a small radial drill of standard design which swings away to permit indexing or removal of the part being machined. On others the power heads are in a fixed position.

A series of jigs or fixtures is devoted to each type of part to be worked and the number of jigs in each series is determined by the number of operations necessary to complete drilling of all holes. In some operations only one hole at a time can be drilled, while in others several holes are drilled simultaneously. The method evolved requires only that the operator set the part to be machined in the fixture, lock it in place and set the drill in operation. For holes which must bottom, the depth to which the drill travels is governed by a mechanical stop; for angle holes the angle is predetermined and the drill, or drills, fixed in the desired position with relation to the jig when the fixture is constructed. Hole diameters are, of course, controlled by the size of the drill used. The drill units are attached to the jig bodies by brackets fitting around the columns.

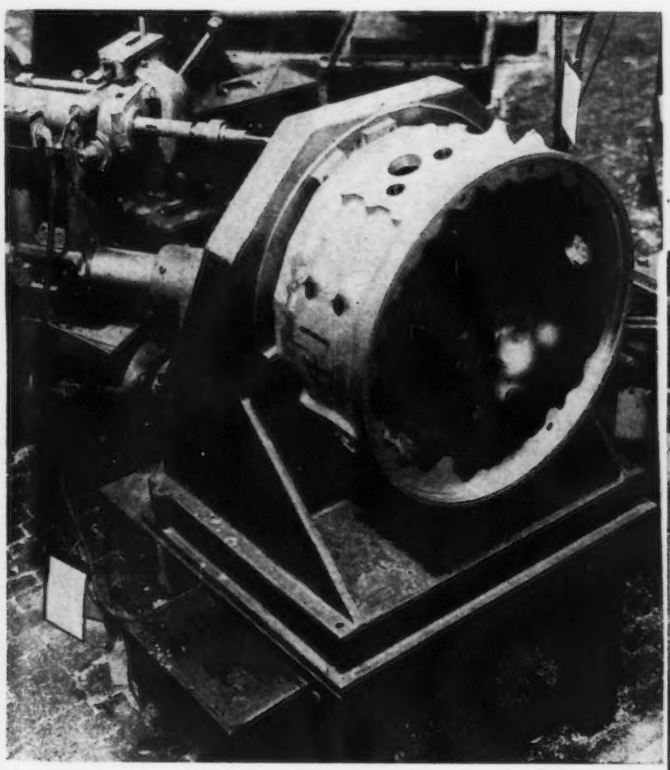

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FIG. 3—By locating the work in a horizontal position it is possible to drill from the rear while maintaining the locating points common to all drilling operations.

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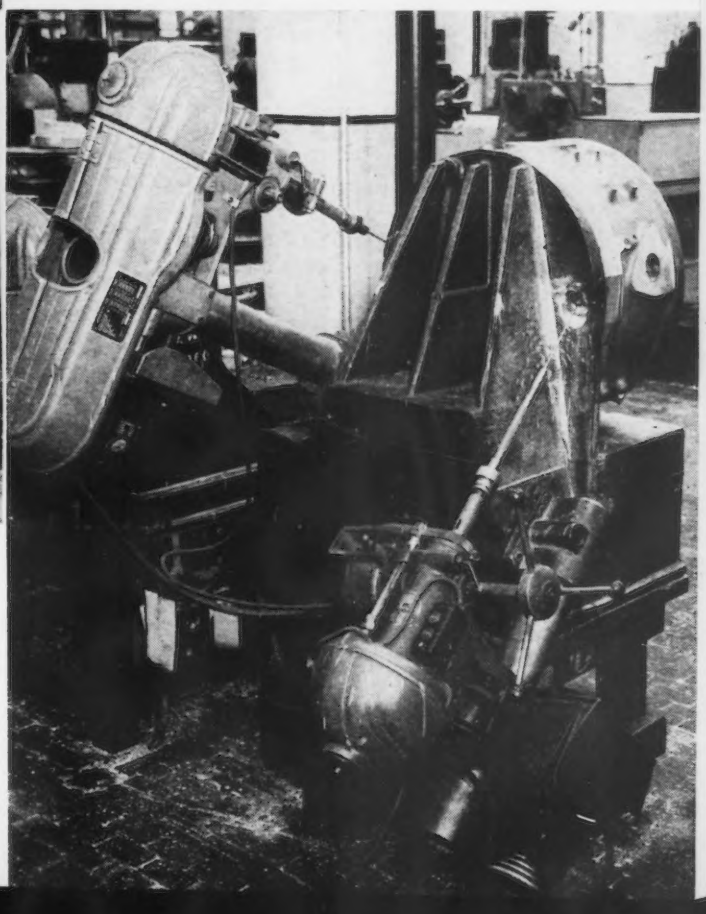

RIGHT

FIG. 4—Operating on the bottom of the workpiece, two drill heads are used in this installation.

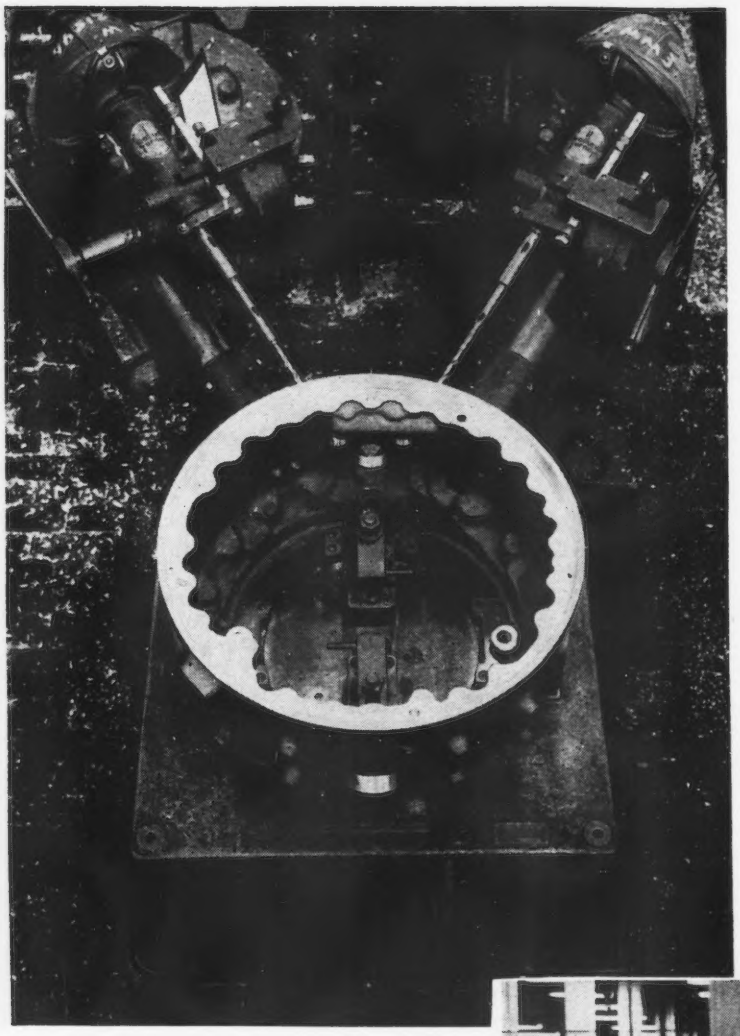

FIG. 5—By placing the two drill units in a horizontal position, loading of the cumbersome workpiece is greatly facilitated.

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so that when a part or operation becomes obsolete the jig will be scrapped, but the unit may be removed and reused on some new jig.

With the individual jig-drill combination the drilling operation is extremely simple. The jigs, the same ones which were used on the tables of the large radial drills, are anchored on separate platform bases. Having determined the specifications of the required holes, tool designers had standard power drills built into the jigs to achieve the desired angles, spacing, etc. No changes, adjustments or setups are necessary. The operator merely places the part in the fixture, locks it, turns the power on and, when the drilling is completed, removes the part and places it in the fixture in the progressive series. All setup time required by the previous method is eliminated and the possibility of error is reduced almost to zero. The only attention necessary on the part of the operator is the replacement of a broken or dull drill. The eliminaion of setup time results in a time saving factor of approximately 30 pct, a considerable amount by any standard of measurement.

In the processing of the rear nose section, shown in fig. 1, four oil passages are to be drilled. For this job a radial type drill head is used to facilitate removal of the workpiece, and the fixture incorporates an indexing mechanism. A hinged bushing plate is raised during indexing, and allows the point of the drill to be guided very close to the work surface.

For the next operation the part is shifted to a second jig, fig. 2, where two angular oil passages are drilled into the distributor pads. In this case a fixed type head is used as there is sufficient clearance for removing the work by raising the drill and flipping up the bushing plate.

Still another oil passage is required to be drilled from the rear, and at a compound angle as shown in fig. 3. This might have been done in a vertical rather than a horizontal plane, but this would have necessitated locating from the opposite end of the workpiece, and as these holes must match corresponding holes in the mating part, a shift in locating points might result in mis-

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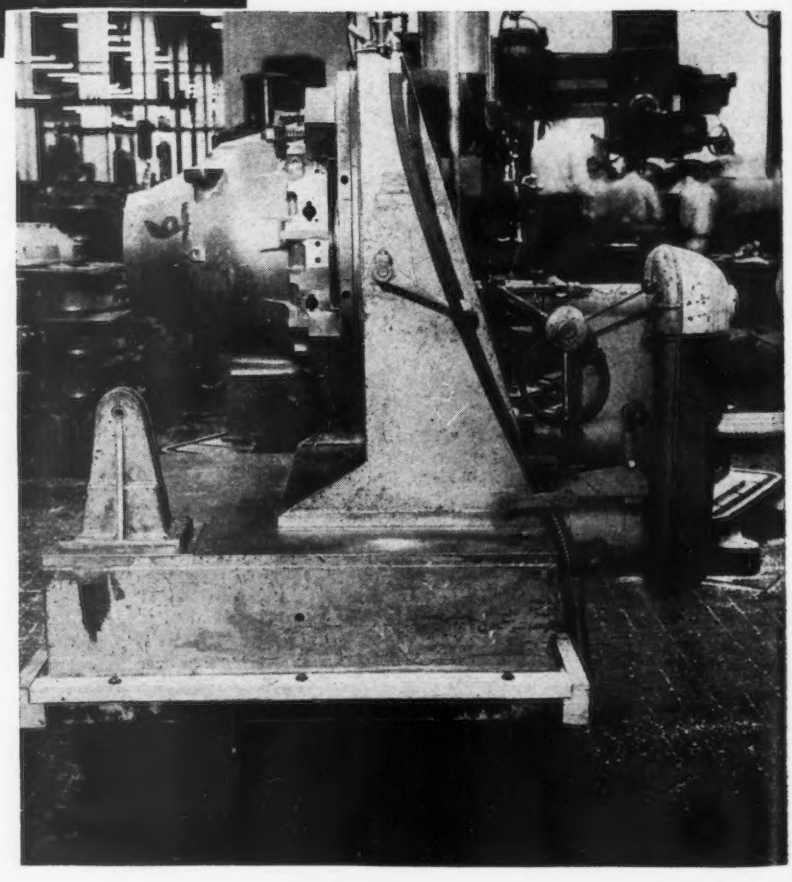
FIG. 6—Through the use of an indexing fixture, 16 holes are back spotfaced and countersunk with a single, horizontally mounted drill head.



alignment. With this type of jig drill, maintenance of common locating points is relatively simple, but with a radial drill this could be accomplished only by the use of an expensive turnover type of jig.

Fig. 4 shows another unusual application in which two fixed type units are attached to the rear of the jig at opposed angles. It will be noticed that the top housing of the drill unit at the right has had to be removed to clear the floor. This was considered preferable to raising the height of the fixture, which would have made it awkward for the operator to load. Ease of loading has been given great attention in the design of these fixtures, since while the parts are relatively light, being made from magnesium, they are large and bulky. This is particularly evident in the setup shown in fig. 5. The obvious way here would have been to have the drill heads in a vertical plane, but this would have necessitated lifting the work into a vertical position and holding it with one hand while tightening the clamps with the other. With the setup shown the part is merely lifted a few inches from the pallet and dropped over the locators, where it remains as the clamps are tightened.

A different type of nose section is shown on the jig drill in fig. 6. In this case it is required to back spotface and countersink 16 bolt holes in an inside mounting flange. A manual index is used, and the operation takes 24 min. By the earlier method, using a radial drill, 60 min were required.

While designed to do a particular job in the fabrication of aircraft engines, it is felt that this method could be applied to any manufacturing process where the requirements are similar. At Wright Aeronautical the fixtures are handling magnesium and aluminum parts but with heavier equipment the same principle could be applied to the working of steel and other metals.

Holes being drilled in Wright engine parts range in size from 0.070 in. to 0.625 in. in diam., but as previously pointed out, the hole size is limited only by the size of the drill unit available. Hole angles, built into the fixture at the time of construction, are likewise limitless. Parts currently being handled run from small supercharger rear covers to the large supercharger rear housings. The number of drills on each unit varies depending on the number of holes which can be drilled simultaneously with the part in its fixed position.

In addition to the time saved under the new system, a factor which substantially reduces operating and manufacturing costs, the large expensive radial drills formerly used to do the job are released for other work where their versatility can be more fully utilized, thereby further speeding up production of parts which originally had to wait their turn.

Plastic Covers for Stretching Dies

IN the manufacture of body panels for buses, ambulances and funeral cars, the Flexible Co., Loudonville, Ohio, makes extensive use of hardwood stretching dies. Experience has shown that these will expand and contract with changes in climatic conditions, regardless of how well they have been made and of how much care is taken with them. Moreover, these dies are subject to considerable wear and require reworking after approximately every lot of 50 panels.

To overcome these disadvantages, the company conducted some interesting experiments with Fiberglas-resin as a protective cover for the dies. The tests of this material proved so successful that all wooden dies are now being given this protective treatment. The

COVERED with eight layers of resin-impregnated Fiberglas cloth, this hardwood stretching die shows no sign of wear after drawing more than 150 panels.

cover is applied in the form of eight successive layers of resin-impregnated Fiberglas cloth thoroughly cured and bonded to the wood by heat and pressure in an autoclave. As shown in the accompanying illustration, this forms a fine smooth surface and assures dimensional stability under all climatic conditions encountered. Dies so treated have been used for the manufacture of over 500 panels without showing appreciable wear.

Stainless-Clad Steel for Auto Accessories

AUTOMOBILE bumpers and other accessories, formerly made from chromium-plated steel or die castings, can now be successfully fabricated from stainless-clad steel, according to an announcement by the Jessop Steel Co., Washington, Pa. The parts will not chip, flake or peel, and maintain a permanently rust-free surface.

Experiments conducted by Jessop Steel on 10 to 20 pct stainless cladding on a mild steel backing indicated that an excellent bond is produced between the two steels. The stainless cladding can be polished to a high finish for a pleasing appearance, while the mild steel backing can be lacquered to protect it from corrosion.

It is claimed that in addition to its shiny, rust-resisting surface, stainless-clad steel has excellent mechanical strength, making it particularly suitable for such applications as automobile bumpers. When collisions or other accidents scratch the stainless surface, it can be reground and polished without losing its rust resistance. Where deep gouges penetrate to the mild steel backing, the stainless surface can be built up by welding and polished to match the original finish.

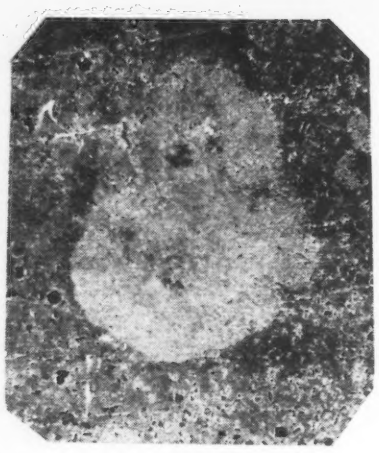


FIG. 1—Zinc-iron alloy (white area) in spelter. Iron in zinc tends to reduce bath fluidity by raising its melting point, and causes hard, brittle coatings.

Effect of Lead in Hot-Dip

By W. G. IMHOFF
President, Wallace G. Imhoff Co., Los Angeles

THE effect of metal impurities in a hot-dip galvanizing bath must be considered from many different angles, since an impurity in the bath at one time, becomes, in the next few minutes, an impurity in the zinc coating. The effect of lead in the galvanizing bath and in hot-dip zinc coatings is not a new subject, but rather one which has been aggressively debated for 25 yr. Examination of the literature and considerable private correspondence on the subject have led the author to the conclusion that the beneficial or harmful opinion formed depends to a very large extent on the angle of interest as to the effect of lead in a hot-dip galvanizing bath.

As a typical illustration of this point, some years ago the purchasing agent of a large steel company stated that the lead content of slab zinc in a carload shipment tested from 0.3 pct to more than 4 pct Pb in the same car. His interest was concentrated on the subject from two different angles; the wide variation in the lead content of the zinc and the fact that he was buying lead at zinc prices.

Still another hot dip galvanizer inquires about the lead in the galvanizing bath from the standpoint of poisonous fumes, while another believes that lead is a big aid in drossing; still another claims that lead in the galvanizing bath accelerates the corrosion of the zinc coating. The purpose of this discussion is to substantiate the belief that lead is very beneficial not only in the galvanizing bath, but in zinc coatings and galvanizing operations.

In some districts where zinc is smelted the zinc ores also carry lead, which goes into the zinc. In other districts the zinc ores do not carry any lead ores and these zincs therefore do not carry lead. It is also worth noting that zincs made from dross and other byproducts from galvanizing do not carry lead because the byproducts have little or no lead in them. When the American Society for Testing Materials established standard specifications for slab zinc (spelter) in 1911 most all zincs for galvanizing were derived from the ore. Hence most all of them carried 1 pct or more lead. So that lead could not be sold at zinc prices, an upper limit for lead of 1.6 pct was written into the standard specifications, but since most all zincs carried lead, no lower limit was set.

Because of the great importance of galvanizing and the large quantities of dross and byproducts produced in World War I, many steel corporations went into zinc smelting. Many scrap metal dealers in the large cities where galvanizing plants were located also went into the smelting of galvanizer's byproducts. Thus an entirely new kind of metal came on the market, a Prime Western zinc that carried little or no lead because little or no lead was found in the byproducts. Just recently a metal of this type showed only 0.05 pct Pb.

A new situation thus developed, in that a galvanizer might order Prime Western zinc from one company and receive zinc that contained up to 1 pct Pb, and then he might order the same grade of zinc from another company and this lot of zinc would contain little or no lead. Since both zincs ordered were by the specification, Prime Western grade, it was always assumed that the quality of zinc for galvanizing was the same, but over a period of years constant troubles both with the operation of the galvanizing bath and the coating conditions have been traced to the fact that the zinc used did not contain any lead. The fact that the troubles were overcome by adding lead to the bath is definite proof that the troubles were caused by the lack of lead in the bath.

Slab zinc carrying about 1 pct Pb has a soft blue

FIG. 3—Large zinc crystals in a melt of high purity (99.9407 pct) zinc.

Galvanizing Baths . . .

The varied effects of lead in hot-dip galvanizing baths, a subject of some controversy, are discussed in this article. Emphasizing the belief that an adequate lead content produces many beneficial effects, such as giving a thin, fluid bath and smoother and more lustrous coatings, the author reviews the sources of lead in spelter and cites several instances in which lead additions served to correct some galvanizing difficulties.

FIG. 2—Two large zinc crystals in a standard slab of zinc.

lead-skin over it. When the slabs are thrown across a railroad rail, they bend before they break. Zincs without lead are brittle and break after 2 or 3 throws against the rail. Zincs carrying lead usually stand from 6 to 10 throws against the rail, first bending before they finally break. In one plant a slab of zinc was thrown 17 times against the rail before it finally broke. Needless to say that it bent considerably before it finally broke.

Lead lubricates zinc; it makes it malleable, soft, tough, and ductile. Because its melting point is much lower than zinc it is chilled out first against the cold mold and gives the slab the bluish lead color. Zincs carrying cadmium have a silver-white cadmium skin, while zincs carrying aluminum have the color of the aluminum skin. Zincs without lead are hard and brittle and may break on the second or third throw against the rail. This simple fracture test has proven to be of much practical value in many galvanizing plants.

When the same trouble is corrected a number of times by simply adding pig lead to the galvanizing bath, there can be no doubt that the trouble has been diagnosed correctly. The bath trouble is that it is thick and sluggish; dross is high and the metal appears to be full of scruff and dirt and oxide. It freezes quickly, gives a heavy run-off stream and is just generally poor for bath operation and coating purposes.

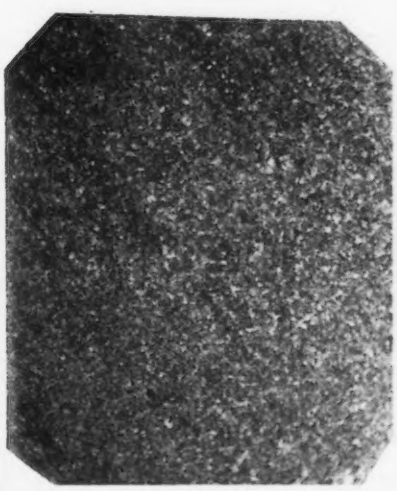


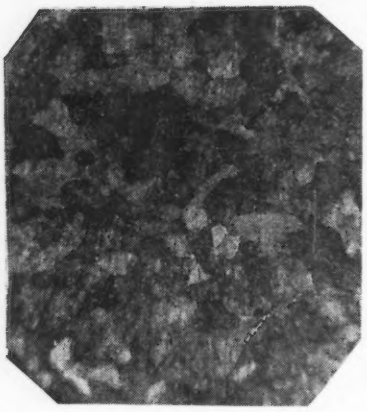
FIG. 4—High purity zinc (same as shown in fig. 3) in rolled condition. Note the very fine crystals.

When these conditions are found in a plant, the very first thing done is to test the pot to see if there is any lead in it. The next thing is to check up the analyses of the slab zinc used to see how much lead is in the zinc. In one plant no sign of lead in the bath could be detected. The manager, when questioned, reported that a couple of tons of lead were put on the bottom of the pot when it was filled with zinc for first melting down. All of this original lead was gone. Tests revealed that the dross was lying right against the bottom of the pot. A checkup on the zinc put in the pot showed that it carried only 0.2 pct Pb, and some shipments were much lower. Dross was excessive, the metal was thick and sluggish. The finish was dull and rough and the zinc per ton of product was extremely high.

Then two tons of lead were put into the pot, 500 lb at a time over a period of a couple of days. The results were startling. The bath became thin and fluid, the coating was smoother and the lustre was so beautiful that the manager stated it was just as it was with new zinc and lead when the pot was started up. The metal deposit per ton of product was almost cut in half, and the operating conditions were greatly improved. This same experience has been recorded in a number of other plants.

The clearest means of illustrating the beneficial effects of lead in a galvanizing bath is to describe the conditions that slowly develop in a bath that does not have any lead in it. There are two kinds of galvanizing baths without lead; a very pure galvanizing bath of electrolytic zinc, and a galvanizing bath using Prime Western zinc that carries little or no lead.

Some years ago the question of electrolytic zinc as compared to very pure smelted zinc for hot-dip galvanizing was a much discussed question. One large steel company operated their wire galvanizing pots on this very pure zinc for 1 week, and then the galvanizer reported that it could not be used for wire to good advantage any more. The pot was then dipped out and the zinc slabbed and charged into pipe and other galvanizing baths that did not require such high quality zinc for coating purposes. The galvanizer,



LEFT

FIG. 5—Micrograph of polished specimen of a slab of zinc.

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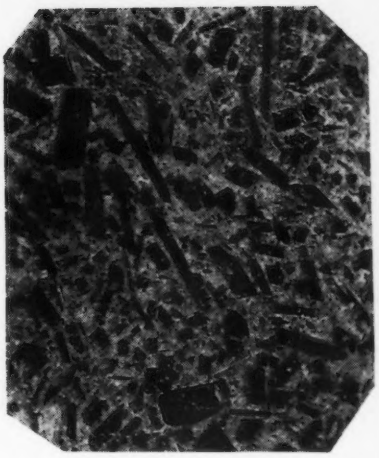
RIGHT

FIG. 6—Dross carrying 3.36 pct Fe. Large slender blade areas are iron rich crystals.



when closely questioned, was not able to explain why the zinc was not fit for further use after a week's time. The explanation is difficult, and even the one submitted here may not be correct, although it is believed that it is a reasonable explanation as to why the metal could not be used for more than a week in the wire pot.

The actual solubility of iron in zinc is extremely low. According to W. M. Peirce in "Studies on the Constitution of Binary Zinc-Base Alloys" it lies in the neighborhood of 0.02 pct Fe. However, in the galvanizing bath a number of tests have shown that zinc dross, or zinc-iron alloy, starts to be deposited out of the bath at a saturation of about 0.1 pct Fe at low temperatures, and increasing up to about 0.13 pct at higher bath temperatures. Since actual tests and chemical analysis sometimes show very little difference in the specific gravity of dross and the bath, it is not uncommon to have the dross float in the zinc, or stay suspended in it, especially if the heat application is such as to give rising heat currents in the bath.

Thus, if a pure zinc bath be considered, or a galvanizing bath of Prime Western zinc with extremely low lead content, then the effect of the iron in the zinc is greatly magnified to deteriorate the quality of the bath. Zinc with a high iron content and little or no lead tends to be very sluggish, thick and dry. A very simple practical test to reveal its effect on the weight of zinc deposited may be made by simply taking a dozen sample articles and weighing them when pickled and after galvanizing. The first six should be galvanized in an absolutely fresh and new galvanizing bath. The other six should then be galvanized 3 months later after the pot has gone into dross making on a standard weekly basis. If all other operating conditions are the same, considerable increase in the weight of zinc coating will be found, due to the saturation of the galvanizing bath with iron.

Fig. 1 shows the effect iron has on zinc. The large white area is zinc-iron alloy. This metal is made up of probably millions of very fine dross crystals packed into an area with very little bath. The tendency therefore is to dry up the fluidity of the zinc and make it "sandy," or "filled with extremely fine hard zinc-iron alloy crystals." This condition radically affects the galvanizing, or coating properties of the bath. It raises the melting point of the zinc, makes it much less fluid; it tends to freeze quickly and therefore gives a very rough coating. Because of the iron in it the coating is very hard and brittle.

Fig. 2 shows two very large zinc crystals in a standard slab zinc purchased on the open market. Fig. 3 shows very large zinc crystals of a melt of zinc of extremely high purity. This spelter had a chemical analysis showing 99.9407 pct Zn. Fig. 4 shows this same zinc rolled. Note the very fine crystals. Fig. 5 is a micrograph of a polished specimen of slab zinc. Fig. 6 is dross carrying 3.36 pct Fe. The large slender black areas are the zinc-iron alloy crystals and the white area between is the galvanizing bath zinc. Fig. 7 shows a commercial dross with some lead scooped up in it. The irregular gray areas are lead.

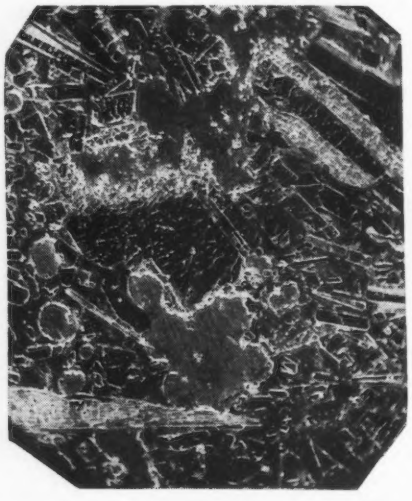


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FIG. 7—A sample of commercial dross with some scooped up lead (irregular gray areas).

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Other Beneficial Effects of Lead

When 2 in. of lead are placed on the bottom of the galvanizing bath, the dross floats on the lead because of the very much greater specific gravity of lead, instead of sticking to the bottom of the pot and making drossing operations very difficult. Pots have been seen where the dross is so dry, because of lack of lead on the bottom of the pot, that six men could hardly push the spoon into the dross to remove it. Dross without lead in the bottom of the pot or lead in the zinc (galvanizing bath) is extremely dry and can sweat or bake into the bottom of the pot so that it is extremely hard to remove it. Lead lubricates both the zinc and the dross and makes drossing very much easier.

One of the most valuable effects of lead in zinc is to give it fluidity. A galvanizing bath high in iron content and containing no lead might be compared to

thick tar or molasses against the pot side. The tendency is to create excessive heat by its thicker consistency and, since the bath is thicker, the heat is not carried off as quickly.

Pot life is greatly affected by not only the temperature of the galvanizing bath, but also by the consistency of the zinc against its sides. The extreme final result would be found in a pot where the pot has been idle for a long time.

Since the galvanizing industry uses from 40 to 48 pct of all zinc smelted, it should be apparent that if there is no lower limit set for lead content in the Prime Western slab zinc specifications, there must be a very wide range of lead in commercial zincs for hot-dip galvanizing. Since these different grades of slab zinc must produce a different quality of zinc coating, a few recommendations and suggestions can be offered to galvanizers who seek a quality coating and better operating conditions. The first suggestion is that if Prime Western slab zinc is purchased, a chemical analysis be made of it and submitted to the galvanizer. If the zinc contains from 0.75 to 1.25 pct Pb, or averages about 1 pct Pb, or the same figures for the sum of lead and cadmium, then the zinc can be used without difficulty. Zinc with little or no lead content when purchased should have metallic lead charged into the bath. A second, and more practical suggestion would be to use a better grade of zinc, such as brass special, or selected, since these brands of zinc carry the correct amount of lead, or lead and cadmium.

Effect of Lead on Corrosion Rate

With respect to the effect of lead on the rate of corrosion of zinc, the following statement is found in the October 1929 issue of the "Bulletin" of New Jersey Zinc Co.: "Variations in the composition among the commercial grades of zinc have not been shown to have any important effect on the rate of atmospheric corrosion, although there is some evidence that lead tends to decrease corrosion somewhat."

New Books

"Executive Thinking and Action," by F. DeArmond. Methods and practices of executive achievement used by leaders in various fields are discussed in this book. These methods are appraised by the author and proposed as a means of achieving successful executiveship. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $3, 251 p.

* * *

"Elements of Mining," by G. J. Young. Review of mining industry covering fundamental engineering principles, cost analyses, transportation and hoisting, ventilation and illumination, drilling and blasting, development, etc. Text, which is well illustrated, is restricted to underground methods of mining, but has necessary references to open pit and alluvial mining. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $6.50, 755 p.

* * *

"Materials for Gas Turbines." A symposium of five papers, including heat-resisting metals for gas turbine parts, high temperature alloys developed for aircraft turbosuperchargers and gas turbines, chromium base alloys, alloys and ceramic materials for high temperature service, resistance of Fe-Ni-Cr alloys to corrosion in air at 1600° to 2200°F, compressive properties of aluminum alloy sheet at elevated temperatures, and tensile and creep strengths of some magnesium base alloys at elevated temperature. American Society for Testing Materials, 1916 Race St., Philadelphia 3. $3 (ASTM members—$2.25), 200 p.

* * *

"Galvanizing Handbook," by J. R. Daesen. Basic principles involved in hot dip galvanizing are thoroughly described. Major emphasis is on the nature and cause of defects encountered in galvanizing operations. Illustrations are particularly effective. Reinhold Publishing Corp., 330 W. 42nd St., New York 18. 166 pp. $5.25.

"Bibliography of Statistical Quality Control," by G. I. Butterbaugh. Extensive, carefully annotated bibliography of books and articles on statistical quality control. Listings cover approximately 340 authors of 712 articles which appeared in 137 different periodicals in the period from 1924 to 1945. University of Washington Press, Seattle. 114 pp. $1.50 (paper bound).

* * *

"Automotive Accessory Industry," by R. H. Warnhoff. Monograph is one of a series of paper bound occupational booklets for use in general counseling work. Topics covered include organization and structure, index of occupations, employment opportunities for men and women, future of industry remuneration, etc. Bellman Publishing Co., Inc., 83 Newbury St., Boston 16, 32 pp. $1.00.

* * *

"Explosion and Combustion Processes in Gases," by W. Jost. Translation of a German work on jet propulsion presenting experimental and theoretical facts underlying explosion and combustion processes in gases. The material should serve as an introduction to the field and should also be of practical value in research. Translation is by H. O. Croft, University of Iowa. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. 621 pp. $7.50.

* * *

"Precision Hole Location" by J. Robert Moore. A complete textbook for the user of precision jig borers and grinders, including tool and die designers, and manufacturers. The first authoritative book ever published on this most important subject, it is profusely illustrated, and covers the entire subject of accurately locating holes with particular reference to securing complete interchangeability in toolmaking and production. For the first time in any publication, a complete set of Woodworth tables are included, giving the coordinates whereby any number of holes may be laid out equally spaced on a circle from 3 to 100 without the necessity for calculating angles. Moore Special Tool Co., Bridgeport, Conn. 448 p. $3.

How to Pour Babbitt Bearings

Simple, but effective, procedures for pouring babbitt to produce sound, dependable bearings are described in this article. This discussion is an outgrowth of a survey conducted by the babbitt and bearing division of Joseph T. Ryerson & Son, Inc., which indicated that many plants, using babbitt in relatively small quantities, lacked a fundamental knowledge of how to pour babbitt bearings.

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By K. T. MacGILL

Manager, Babbitt & Bearing Div., Joseph T. Ryerson & Son, Inc., Chicago

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FUNDAMENTAL in the making of good bearings is the selection of an alloy having the proper physical properties, hardness and compressive strength, freedom from segregation, and good grain structure. Aside from the fact that the selection of such an alloy is a necessity in order to secure dependable, long life bearings, the procedure followed in casting is also tremendously important if good bearings are to result. Even the best babbitt can fail in service if a few fundamental pouring rules are not followed.

For every large plant or shop that is completely equipped for pouring bearings there are dozens of other plants that follow no established routine in pouring the relatively few bearings they are called upon to produce each year. The task may be delegated to an inexperienced workman, or perhaps to anyone in the shop who happens to have time available. Under such circumstances, all too often the results fall considerably short of the near perfect job that could be secured.

There are many ways in which bearings can be poured, with assurance of equally good results. However, experience has proved that if the basic principles of heat transfer from molten metal through the bearing shell are observed, good bearings with lining tight against the shell should be obtained, regardless of the particular setup or method followed. The average plant or shop usually has or can readily devise the equipment and fixtures that are required. From this point on, it is only necessary to follow a few simple, fundamental rules.

It pays to always use new babbitt, made of virgin metals. When the proper grade has been decided upon for the service involved, do not mix the virgin material with reclaimed or scrap metal of unknown analysis. While it might appear that reusing old metal is one way to save on bearing costs, it is seldom wise to try and economize by mixing old, used metal with new. Too often dirt or other harmful foreign matter will be included, or metals of unlike analysis may not produce the dense, close grained structure required to successfully resist wear. If a sizable quantity of old metal is accumulated, this can be used for pouring secondary bearings where loads are light and performance requirements are less exacting.

Using a wire brush, clean all equipment, fixtures and the inside of the shell thoroughly. Follow this with a blowtorch and further brushing if necessary. The blowtorch also serves to drive out all moisture from the bearing shell, an important step. The mandrel should be as thin walled as possible, with ends closed with wood plugs to prevent heat loss.

Put a waste head on top of the shell. This takes care of the problem of shrinkage as the bearing solidifies, assuring sufficient metal to completely fill the bearing area. The waste head is made of a putty-like substance that is especially prepared for the purpose, and as it does not dry out may be used over and over again. The height of the waste head depends upon the size of the bearing; larger bearings requiring more excess metal at the top to make up for shrinkage. Fig. I illustrates these steps.

Before the melt is started, make sure that sufficient babbitt is at hand to pour the entire bearing at one time. This is necessary in order to obtain a dense and completely uniform structure. The melting pot should be placed close to the work; the closer the better. This will prevent heat loss in the ladle as the molten metal is transferred from the pot to the bearing fixture.

Follow the manufacturer's recommendation for correct pouring temperature. Generally speaking, a temperature of from 850° to 950°F is sufficient. After the babbitt is completely molten, the best pouring temperature is related to the thickness and size of the bearing being poured. The metal should pour about like water. Heating to a slight excess is not harmful; the only disadvantage being the accumulation of a higher percentage of dross resulting from oxidation. Thick, heavy bearings can be successfully poured at a lower temperature than long and thin bearings. The metal must be hot enough to reach the bottom of the mold and start to build up before any sign of setting occurs. One simple method of checking to determine if the metal has reached the correct pouring temperature

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FIG. 1—Simple precautions which, if observed in pouring, will aid in producing sound, dependable babbitt bearings.

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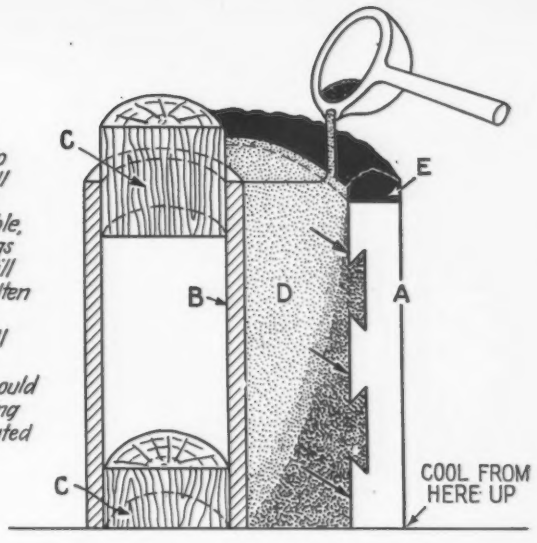
Warm bearing shell (A) to about 200°F to drive out all moisture. Use thin-walled mandrel (B) where possible, closing ends with wood plugs (C) to prevent heat loss. Fill bearing area (D) with molten metal up to top of waste head (E). Cool bearing shell with water or wet rags from bottom up, which should result in babbitt solidifying against the shell as indicated by the arrows



is to insert a small dry pine stick in the pot. It should burst into flame immediately upon contact with the hot babbitt.

Before starting the pouring operation, warm the bearing shell to a temperature of about 200° F. As previously stated, this serves to drive out all moisture and also prevents too quick or nonuniform solidification of the molten metal. Fill the space completely and as rapidly as possible, continuing pouring until the top of the waste head is reached. Cool the bearing shell by applying water or wet rags, starting at the bottom and working slowly upward. By thus drawing the heat outward, the metal starts to solidify at the inside surface of the shell, adhering tightly to the wall. As the babbitt sets and contracts in this area, the void is filled with hot metal from the mandrel side which in turn is fed from the surplus metal provided by the waste head at the top of the shell.

When the metal has completely cooled and set, if the bearing has been properly poured, the mandrel should not stick but should free itself from the fixture with little effort. While conditions and facilities will vary from shop to shop, if these simple, basic rules are followed there is no reason why every bearing produced should not be sound, dependable and capable of giving long, trouble free service.

Universal Drilling and Tapping Machine

OFFERING a wider range of machining applications in a single machine than ever before attempted, a portable universal, horizontal drilling and tapping machine known as the Kaukauna series 125 has been introduced by the Kaukauna Machine Corp., Kaukauna, Wis. All the combined operations of the conventional radial and horizontal drilling and tapping machines are said to be available in a single machine which can drill and tap at any angle in any plane within the maximum and minimum limits of movement of the individual units.

An important feature of these machines is the head which swivels 360° in either a horizontal or vertical plane. Thus, it is possible to operate the spindle, which has a 12-in. continuous travel, in any conceivable angle. The headstock is positioned on two individually controlled axes to permit the head to swivel 360° on a trunnion, and the trunnion to swivel 180°. The two rails, supporting the head and trunnion, have a 24-in. horizontal traverse, and their movement is accomplished through dual handwheels with dual hand-clamps locking the rails into position.

In addition, the rail may be raised or lowered by power and be positioned at any point suitable to perform the machining operations. The rail may also be swiveled through 360° to perform machining operations at any point around the machine.

Three spindle feeds are provided, and the drive to the spindle consists of a nine-speed gear change box, with a direct drive to the spindle through the necessary gears and drive shaft. The nine speed changes are actuated by dual rotary selector levers with an indicating dial showing at all times the spindle speed engaged. The levers are located near the head and are always within easy reach of the operator, regardless of the head position.

A total of 36-in. spindle movement radially from the center of the column is available, since the head is mounted on two horizontal rails which have a 24-in. horizontal adjustment and the spindle has a 12-in. continuous travel. This feature is of particular advantage because of the rigidity which is maintained by advancing the head toward the workpiece, thus avoiding long overhang of extension sleeves and holders. To facilitate handling machining operations on long workpieces, the column is supported on a traveling column base which has a 48-in. power travel.

All three models of these machines when centered within cylindrical work will drill or tap holes at any angle without changing the position of either the machine or the workpiece, as the spindle is radial to the center of the column of the machine.

Thread Rolling —

A MODERN design of thread rolling machine in which two circular dies are employed under hydraulic pressure in an action similar to centerless grinding.

GRINDING, like all other methods of metal removal, is a process which physically overcomes molecular cohesion. Small particles of metal are plucked and scraped away from the parent body, and considerable stress, exceeding the ultimate strength of the material, is developed as the particles are torn off. The remaining or new surface is in a disturbed state since, unlike fluids, the surfaces of solids cannot readjust themselves to an unstressed condition. The more gentle the metal removal process, the less the residual surface stress developed.

When heavy sliding loads are applied to machined surfaces from which the disturbed particles of metal have not been removed, the surfaces become completely disjoined from the parent body in a relatively short time, this is termed great initial wear. Further wear, after the majority of these loosened particles have become separated from the parent body, takes place at a very much slower rate.

This is the concluding section of an article, the first two parts of which appeared in the Dec. 19 and 26 issues of THE IRON AGE, *and dealt with the design of thread rolling machines and die manufacture respectively.*

Under certain conditions, under even light sliding loads these disrupted particles gouge the sliding surfaces, producing a chip of ever increasing size. Obviously merely hardening such surfaces cannot cure galling. As the surfaces increase in hardness, so do the loosened particles. The only effective means of preventing galling is to completely remove the loosened particles before application of load.

With steel gage blocks where even slight initial wear cannot be tolerated, the overstressed surface and all loosened particles must be removed. This is accomplished by removal of the last fraction of a thousandth with the gentlest of abrasive actions.

The depth and magnitude of the residual surface stresses can be easily determined by the use of thin steel strips, described in detail in Almen's paper noted in the bibliography. Working surfaces of thread rolling dies saturated with malignant stresses are particularly vulnerable and it might be assumed that lapping would remove such stresses. That depends in the first place whether surface stresses in the threads of dies are malignant or benign. In the latter, it is advantageous that the surface stresses be allowed to remain. Secondly, it is extremely difficult to lap the threads of dies without distorting the thread form, thus causing more harm than good. With flat surfaces such as gage blocks, lapping can proceed with a circular motion and many points on the surface of the lap are thus brought into contact with many points on the gage block. On the other hand, thread rolling dies can be lapped only in the direction of the threads. Regardless of whether the die or lap is above the other, the oil containing the lapping compound seeks the thread roots of whichever is underneath, with the result that metal is not uniformly removed from the die threads. Some customers, having received dies which had been milled, heat treated and then lapped, have attempted to restore the accuracy of the die threads sufficiently to permit rolling to class 3 tolerances, by correcting on thread grinders. From 0.015 to 0.024 in. had to be removed in most instances in order to clean up the lapped threads, which was such a large proportion of the thread depth, that it was found more economical to completely remove the lapped threads on a surface grinder, and thus eliminate the operation of picking up the original unmatched threads. It would appear therefore that the best results can be expected by taking very light finish cuts on thread grinders, at least until improved means of lapping are developed.

Another promising method of removing malignantly stressed layers from the working surfaces of thread rolling dies resulting from too heavy finish cuts, is by means of the high velocity impingement of ultra small abrasive particles against the die threads. With this process the velocity of impingement of the particles, and the particle size, is such that only the disturbed or poorly bonded material, or soft skin, is abraded away, leaving the securely bonded or undisturbed metal intact. Distortion of the thread profile is negligible because only a very small amount of surface metal need be removed to get down to firm material, and even though the abrasion may not be exactly uniform a large variation in a minute amount of metal removal can barely be detected.

In order to use very small particle size, on the order of 1200 to 2500 mesh, it is necessary to confine the abrasive material in a liquid; otherwise, it would be impossible to capture it for reuse after the first pass through the nozzle. Such fine particles resemble tobacco smoke when blown into the air, remain in atmospheric suspension for many hours, and are not

Theory and Practice

By J. W. BATCHELDER
Ascutney, Vt.

Methods of finishing thread rolling dies by grinding, lapping, and abrasive blasting are discussed herein. Information is also presented on testing various types of steel, setting up the dies, and inspecting dies and threads by means of an optical comparator.

conducive to good health. The liquid most commonly used is a combination of water and rust inhibitor. The nozzle is located in a liquid tight chamber and directed by hand against the parts being processed. The operator wears rubber gloves and observes the procedure through a glass window in the front of the chamber. This process also imparts an extremely pleasing appearance to the dies, concealing grinding marks.

There is good reason to expect that benign surface compression stresses can be developed in this same manner in the die thread surfaces. Tests have conclusively shown that this process is capable of developing surface compressive stresses in Almen test strips.

Nitriding can also be used to develop surface compression stresses in die threads, and is favored over carburizing which does the same thing. The danger with both processes, when applied to tool steel, lies in overshooting. From 0.00025 to 0.0005 in. is sufficient with nitriding, which corresponds to about 15 to 30 min in the salt bath. Ammonia gas nitriding is not recommended for this application. No quench following nitriding is necessary and the distortion is negligible. The principal requirements preparatory to nitriding are a uniform sorbitic structure and complete freedom from decarburization. Fatigue does not start at the surface of nitrided pieces, therefore small surface defects and scratches are not so detrimental as with steels which have not been nitrided. This, and the fact that fatigue failure begins just below the nitride skin, shows how effective nitriding can be in extending the endurance limit.

Effect of Grain on Die Life

Tool steels do not exhibit grain flow characteristics to nearly the same degree as can be observed in rolled thread screws. Nevertheless it is possible that the grain direction of the die blanks may have an effect on die life. Practically all flat dies are now being made from bars in which the grain runs the long way. Billets can be cut such that the grain runs across the face of the dies from one edge to the other, or through the dies from face to back. In checking on these possibilities for improvements it might be well to also include some pancaked forgings which are made by squeezing a bar endwise and drawing it out to the desired length in one of the other two directions. Excellent carbide distribution is expected to result from this latter treatment.

In conducting thread rolling tests it is very important that they be economically planned so as to yield the maximum amount of data with the minimum of time, expense and effort. Careful planning can reduce the probability of unforeseen variables creeping in and can also reduce the number of experiments necessary to acquire any given amount of information. For example it is not necessary to test all of the various brand names of tool steel to arrive at a final choice. To begin with it is only necessary to test dies made from each of several promising basic types of steel, which are 5 pct chromium high carbon air hardening, 12 pct chromium high carbon oil hardening steel, and high speed steels in the 1.5 pct tungsten—8.5 pct molybdenum, 18-4-1, 6-6-2 or M2, and possibly 0-8-2 molybdenum—vanadium groups.

The 6-6-2 and M2 molybdenum high speed steels are slightly more sensitive to overheating and grinding burn than 18-4-1 tungsten high speed steel. Greater toughness is claimed for the molybdenum high speeds, a valuable characteristic. The 1.5 pct tungsten—8.5 pct molybdenum high speed steels should be heat treated only in a salt bath. The 6-6-2 and M2 steels can be heat treated in either salt bath or atmosphere. The practice of seeking increased toughness by appreciably lowering the quench temperature should be discouraged. Nonuniformity and/or retained austenite are quite likely to result from this practice. It is far better to regulate the carbon content to give the desired hardness, keeping it slightly on the high side, so that close hardness control can be obtained by elevating the drawing temperature slightly. Little if anything can be done to increase the hardness of dies too soft due to insufficient carbon.

Etched samples are freely available from the steel manufacturers showing the extent to which segregation and ingotism can be controlled.

Some one person, in each organization, should be made responsible for the analysis and fitting together of thread rolling information collected, and for separating the wheat from the chaff. Data which are incompatible with a preponderance of conflicting information should not be discarded, but put in the questionable file. Frequently such data are subsequently found to be reliable with exceptions, or throw light on other findings. In this way a general overall understanding of advanced thread rolling practice is most rapidly and assuredly acquired. For example, consistent chipping of the die threads where they run out at the edges of the dies nearest the screw heads can be the result of many causes, such as improper die chamfer, excessive shoulder radius on the screw blanks, cobalt or too much vanadium in the die material, inadequate stress relief, insufficient metal removal when reclaiming worn dies, retained austenite,

too hard, improper die steel, presence of segregation or carbide stringers in this region, hard spots in the blanks, etc.

With round dies, penetration rates, finishing turns and leave-off are taken care of by the thread rolling machine. Except when rolling stepped or slightly tapered threads the dies are cylindrical, and no die profile formers are necessary when grinding the threads. With flat dies, however, these factors must be built into the dies and when the threads are ground these characteristics are imparted to the dies by the profile formers. The number of available work turns being limited by the length of flat dies imposes limitations on the number of work turns, or fractions thereof, available for each of the individual phases of rolling threads.

Approximately one third of a work turn is needed for leave-off. Since a pair of dies penetrate spirally into the work as illustrated in fig. 5 (Part I, THE IRON AGE, Dec. 19, 1946, the finishing turns are effective in half turn increments. When three equally spaced round dies are used, the penetration progresses in three interlocked spiral paths and the finishing turns are effective in one third work turn increments. At least three finishing turn increments should be used, which amounts to one and a half work turns with flat dies or one work turn with three equally spaced round dies.

Thus it is that with flat dies a minimum allowance of half a work turn for leave-off and one and a half turns for finishing leaves a limited number of turns available for penetration unless small diameter work is rolled on long dies.

Tapered dies such as the Boltmaker type can be run in thread rolling machines with or without tie bars across the dies, with excellent results in either case. Such dies are usually made single face, it being impractical to apply threads to dies tapered on both sides, or to hold them firmly in the machines.

Flat face dies, commonly made either single face or duplex, can be operated in machines without tie bars but not in thread rollers which have them, unless extremely long starting radii are used. Long starting radii are not entirely satisfactory because in turning the dies end for end in the machines, the starting radius becomes the leave-off radius, which being superfluous, involves too much sacrifice in the length of the dies available for the penetration function.

Toeing In Dies

Some operators toe in flat dies while others do not. The advantages of one practice over the other are more or less imaginary. German thread rolling articles indicate that it is a universal practice in Germany to set the dies nearly parallel, which is necessary to effectively round up the work. The advantages of both practices are present in tapered dies. As with flat dies toed in, the long gradual taper eases penetration, and as with flat dies set up parallel, the finishing sections of tapered dies are parallel, which affords the best conditions for finishing the work. Quite possibly the practice of toeing in the dies is the result of using dies having inadequate drop-off at the starting ends. In other words, toeing in parallel faced flat dies eases the penetration rate at the expense of inadequate rounding up of the work.

The drop-off at the starting ends of flat dies should be a little more than one thread depth. In this way the blanks can be started on the starting radius at a reasonable distance back from the starting ends of the dies, as illustrated in fig. 10, while the main body of the dies can be set parallel for best finishing conditions.

The length of the starting radius should be about one work turn or π x the blank diameter. Dies having this profile have received very enthusiastic praise from many users. A longer starting radius reduces the number of effective work turns unless the leave-off radius is maintained at a minimum, in which case the dies cannot be turned end for end. A shorter starting radius results in the penetration being too abrupt. Dies having this profile can be toed in where preferred, but do not have to be.

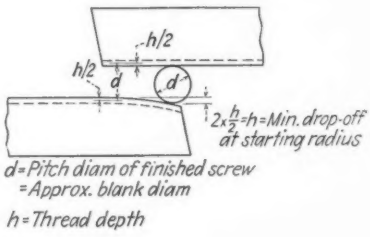


FIG. 10—Basis for determination of adequate drop-off at the starting radius to permit flat dies to be either toed in or set parallel to each other.

The practice of tapering down the crests of flat die threads, while leaving the pitch line and roots parallel with the back of the die, in an effort to alleviate excess starting stresses, is a chronic fallacy. Die threads having either flat or rounded crests are relatively poor penetrating instruments owing to their bluntness. The resistance to penetration increases rapidly with increased truncation. When flat die thread crests are tapered down with respect to the pitch line and roots, the width of the truncation is thereby increased 116 pct of the amount removed from the thread crests. The resistance to penetration of such threads actually increases at a more rapid rate than it is alleviated by reducing the height of the threads. This practice is further detrimental when double width dies are used. The threads cannot be tapered down all of the way across the dies, because when turned end for end to use the other edge, the tapered crest threads would come at the leave-off ends of the dies.

To obviate this condition the thread crests can be ground down only part way across the die face. The length of work which can be rolled on such dies is therefore limited by the width of the crest relief.

Wood screws and some types of sheet metal screws have spaced threads, which require dies with thread crests very much wider than the roots. Owing to the greatly increased bluntness such die threads meet with considerable resistance to penetration, one of the principal reasons why wood screws are not universally thread rolled.

Universal Thread Matching

The matching of flat die threads is an improvement that involves very little additional cost. Universal thread matching of the dies is much more desirable than matching in pairs or sets. When universally matched any die can be exchanged for a similar one, once the dies are initially set up properly, without materially disturbing the setup. Unlike individually matched pairs or sets, universally matched dies do not have to be stocked and run in sets. Any long and any short die can be operated together.

In order that universally matched dies can be turned end for end in the machines, and still remain matched, it is best to locate the center of the crest of the threads

in one die midway of its length and width. Likewise the center of the root of the thread in the other die is located in the middle of the die face. For instance, all short dies can have the thread crests centered in the middle of the die faces and all long dies can have their thread roots correspondingly centered. Boltmaker tapered dies can be matched at any point along their length since they cannot be turned end for end in the machines. When flat dies are matched at their centers, and then the centers of the two dies are aligned at near the mid-stroke of the machine, the axis of the blank being rolled will be in line with the two die centers, and a die thread crest will be exactly opposite the thread root in the other die, when rolling single threads. This also holds for any odd number of threads. When rolling double, or any even number of threads the crests of die threads, or the roots, should be directly opposite. Therefore, when matching die threads for rolling an even number of threads in screws, both the long and short die should be similar with respect to the location of the threads instead of offset one half a thread pitch, as when rolling an odd number of threads.

Die threads are much more easily inspected on comparators than by any other method. Furthermore, the inspection is much more comprehensive than is possible with wires or thread micrometers. Only with comparators can the entire thread profile be checked. Both round and flat dies can be inspected on the same instrument. Furthermore the comparators themselves can be checked with only a precision square, parallel and small wire of known diameter. By means of a reflection attachment flat die helix angles can be measured to within plus or minus 1 min.

With round dies the diameter and thread form are two individual entities. The thread form and pitch should be as nearly identical as possible, but providing the pitch diameters of all round dies in a set are alike within about 0.001 in., the pitch diameter can vary 0.020 in. or more from one set to another.

Wire measurements tell the pitch diameter of round dies, providing the half angle is correct. They do not, however, provide any information at all regarding the degree of perfection of the thread form. Neither do thread micrometers.

With flat dies there is no association between the die thickness and thread form, and likewise wire measurements tell very little of the required information regarding thread accuracy. Measuring from the tops of wires down to the thread crests and also to the roots shows the height of the thread crest above and depth of thread root below the pitch line. It is desirable to know the entire thread outline, including the flank angles, root radii, width of root and crest, etc. Optical comparators show all of these points, and at the same time give everything that can be obtained by wire measurements. In addition, thread pitch can be checked to within 0.0002 in.

In operation, a narrow beam of light is projected over the thread profile to be inspected. This beam is magnified by a lens and reflected by a precision mirror on a frosted glass screen. The usual magnification is 62.5 times the actual size of the thread. Every 0.001-in. error in the thread profile is magnified to 1/16 in. on the screen, and can easily be read with an ordinary rule. In fact, with a little practice 0.00025 in. can be read in this manner, which is an error of 1/64 in. on the screen. Other degress of magnification of 10X, 32.25X and 100X size are available.

To facilitate quick comparison of the projected shadow of the thread profile with the desired profile, the latter is accurately drawn to scale to the required degree of magnification on transparent celluloid, with India ink, preferably using fine broken lines. These enlarged celluloid drawings of the thread profiles are held in place on the frosted glass screen by means of clips. The purpose of using broken lines is to facilitate accurate alignment of the form chart and silhouette of the thread being inspected.

Different charts are made for each thread pitch and tooth form and filed for ready reference. By means of the Ozalid photoreproduction process, prints can be made of these charts and sent to both inspection and manufacturing departments.

When inspecting die threads in this manner the flanks of the silhouette and chart are lined up. The crests and roots of the shadow of the thread profile should fall within the prescribed limits, which are

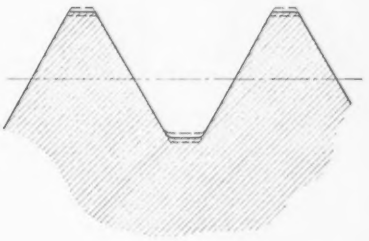


FIG. 11—Profile of an accurately produced thread die as seen on a comparator. The root and crest shadows fall within the upper and lower limiting lines.

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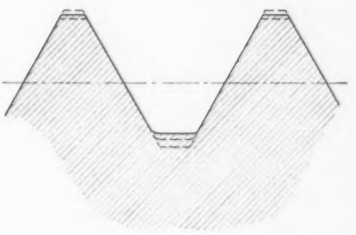

FIG. 12—Profile of a thread which has passable crests but is not deep enough below the pitch line, indicating the necessity for dressing the thread grinding wheel, or regrinding the hob.

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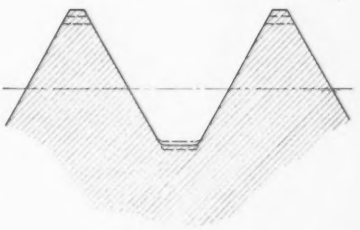

FIG. 13—The overall depth of this thread is too great, as shown by the shadow projecting above the top limit line. It may be remedied by topping with a grinding wheel.

defined on the charts by means of double lines representing the maximum and minimum permissible height of die thread above, and depth of thread below the pitch line, as illustrated in fig. 11. In this figure an acceptable thread is seen, since no appreciable error exists anywhere along the entire thread profile. Fig. 12 shows a thread which has passable crests but is not deep enough below the pitch line. In this case the remedy is to bring the diamonds closer together in order to narrow down the wheel tip, if the threads were ground on a thread grinder, or regrind the hob if the threads were milled.

Fig. 13 shows a die thread which has been made too deep, although the form and width of the cutting tip is satisfactory. This type of thread profile is desirable when grinding short flat dies which have starting and leave-off radii. The extra stock left at the thread crests is removed when the wheel is indexed over half a thread pitch for topping the threads. This is also the method recommended in grinding threads in Bolt-

maker or tapered dies, so as to obtain uniform thread profiles along the entire length of the dies.

The same comparators can also be used to inspect threads being rolled in the blanks for thread profile, lead, ropiness and circularity. Rolled threads frequently contain combined errors which are offset by being undersize on the pitch diameter to a degree such that a ring go gage will receive, and no-go gage will not receive them. Such threads might appear to be satisfactory but would be actually substandard.

Comparator Charts

When making transparent thread outline charts for use on comparators, the pitch line is first drawn at about the center of the sheet. Next, points are marked off along the pitch line at half pitch intervals, which would be 1 9/16 in. apart for a 20-pitch thread at 62½ magnifications. If the thread has a 60° form, lines are drawn at 30° from the vertical through the points already marked off, sloping in alternate directions, to their points of intersection, which represent the flanks of the threads. The height of the die thread is next measured off at enlarged scale above the pitch line, and a line drawn to intersect the sloping lines, which represents the crest of the die thread. A similar horizontal line is then drawn representing the die thread root. When dealing with layouts of die threads, it should be constantly borne in mind that the crest of die thread forms the root of the thread being rolled, and that the root of the die thread forms the crest of the work.

Whether a hob or thread grinding wheel is used to form the threads in the dies, the corners of the cutting tip break down first. Some tolerance, however small, should be provided at the corners of the cutting tips. Also some tolerance must be made on the depth of penetration of the cutting tip. This last tolerance is provided for on the charts by means of a pair of lines representing the limits of the height of the die thread above the pitch line.

The tolerance of the width of the cutting tip, and also depth of thread below the pitch line is likewise defined by double lines on the chart outlines. The upper of this pair of lines also governs the maximum allowable breakdown of the corners of the cutting tip, which in the case of thread grinding wheels should be a radius of 0.002 in. or ⅛ in. on a chart drawn to a scale of 62½ times actual size. It will be found more convenient to first draw the thread outline at the desired scale with pencil on paper, in which case it is then a simple matter to trace the outline with India ink on celluloid. The celluloid takes the ink better if it is first roughened slightly by rubbing with an ordinary eraser. Fingers should not come in contact with the roughened surface of the celluloid until the ink has been applied, because the slight amount of oil from the skin, on the celluloid, will shed the ink and cause the width of the lines to vary.

When it is desired to roll Whitworth, BSA, or Aeronautical threads, two radii, one inside of the other, are substituted at the crests or roots of the die threads, in place of the pair of horizontal lines previously referred to, defining the maximum permissible variation at these portions of the die threads.

To allow for slight wear or crumbling at the crests of the die threads it is preferable to make the height of the die thread above the pitch line the basic height with a plus tolerance. So that the OD of the screw cannot ever be oversize, the depth of the die threads below the pitch line is preferably made the basic depth with a minus tolerance. In this way the two thread depth tolerances do not become cumulative. It should be kept in mind that the pitch line distance between thread flanks should always be equal. When these distances are unequal, it shows that the pitch line has definitely been misplaced.

Accurate and completely dependable thread form dimensions can quickly be determined by laying out the thread outline at from 200 to 500 times the actual size. The former scale will be found convenient for large threads, also a scale of 250 times size, where 0.001 in. equals ¼ in. The finer threads are more conveniently handled at the larger scale where 0.001 in. equals ½ in. Unknown dimensions can be very accurately determined in this manner, much more quickly than they can be calculated. It has been found good practice to check all new thread forms in this manner before going ahead with the manufacture of dies.

Die Thread Angles

The included angle between the thread on the finished screws is not the same as the corresponding angle of the die threads used to produce the screw threads, except when rolling at very slow speeds. At rolling speeds such as are generally used, the die thread profiles must be modified to produce rolled threads to specified dimensions. Not only must compensation be made in the included angle of the die threads, but also in their total depth. The latter is a result of the depression of both the die and work threads due to the extremely heavy loads incidental to rolling threads. For this reason it is preferable to increase the depth of the die threads about 2 pct.

The included angle between the die threads should be made more acute, when rolling threads at high speed, than is required on the corresponding portion of the threads on the screws, by maintaining the root width of the die threads and increasing the crest width. The amount of included angle compensation to be used is governed by the nature of the material being rolled, but for general applications, the reduction of the angle between the die threads to around 59° can be expected to produce threads on the work very close to 60°. In certain cases, where the rolling speed is high and the work has considerable elastic recovery, included angle compensation of 1° 30 min has been found necessary. When rolling heat-treated stock at reduced speeds, very little thread angle compensation will be needed, in which case specifying an included angle of 60°, plus 0 minus 10 min will be found to work very well.

Large scale thread form layouts at 200 to 500 magnifications greatly facilitate the determination of all thread dimensions when taking into account the included angle and depth compensations necessary for even reasonably close work.

When rolling special thread forms, particularly when the outline of the thread crest is dissimilar to the root, considerable attention must be paid to the position of the neutral rolling diameter. Small instrument worm threads and spaced threads such as are used on wood and certain types of sheet metal screws are classic examples.

The neutral diameter is the diameter of the imaginary circle around which the thread rolls. It is the theoretical line at which there is zero slip, on either side of which rolling slip in opposite directions takes place. With standard 60° threads the neutral diameter starts at the blank diameter at the beginning of

the rolling action, decreases somewhat below the pitch diameter as penetration progresses, and approximates the pitch diameter at the point where the thread is completely formed.

With threads having dissimilar crests and roots the neutral diameter may be considerably larger or smaller than the pitch diameter. The neutral diameter is the proper basis for determining the helix angle to be used when making the die threads.

When the die thread crests are substantially wider than the roots, as with wood screws, the predominating point of traction takes place at the die thread crests because of their relative bluntness and the great resistance to penetration incidental to blunt die threads. This has the effect of causing the work to roll along a neutral diameter which is very near to the root diameter of the work. When this is the case, the axis of the work will not travel as far, with flat dies, in one work turn, as it would were the thread crests and roots symmetrical. The lead or helix angle of the die threads must be increased, so that the die threads will track perfectly with the grooves being rolled in the work as it rolls along the faces of the dies.

So far as is known there are no tables or data available for publication giving the proper helix angle to be used with the various sizes and types of threads having relatively wide roots. In the absence of such data it is necessary to establish the neutral rolling diameter, or proper helix angle for each instance, by experimental means. The neutral diameter can be obtained by measuring the exact distance travelled by the axis of the screw, relative to the faces of the dies, and dividing this distance by π.

When computing the proper diameter for round dies when rolling threads having relatively wide roots, it is necessary to base the calculations on the work neutral diameter instead of the pitch diameter. The neutral diameter of the die must be a whole multiple of the work neutral diameter. The die pitch diameter is then found by subtracting the total diametrical difference between the work pitch and neutral diameters from the die neutral diameter.

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Detecting Carbon Tetrachloride Vapors

A SIMPLE test for determining the presence of dangerous carbon tetrachloride vapors in air has been developed by the Research Laboratory of American Optical Co. In view of its simplicity and speed, the test may prove useful in many industrial plants and laboratories, where a quick, rough check on the purity of air is desirable.

The coil of copper wire[1] is inserted into the base of the flame of an alcohol lamp and the color of the upper part of the flame noted. In the presence of carbon tetrachloride in a concentration in air exceeding five parts per million a slight but unmistakable green color is imparted to the flame. In the absence of carbon tetrachloride no green color is seen. If certain other undesirable volatile chlorine compounds are present, the test may show the green coloration also.

[1] *Approximately 6 or 8 in. of ordinary bell wire or other untinned copper wire about the diameter of a pencil lead, one end of which is stripped clean of insulation and formed into a spring-like coil. This coil may be about ½ in. long, consisting of two or three spiral turns of the wire and approximately ¼ in. in diam.*

The proper flame from the alcohol lamp should be bluish in color with little or no luminous flame and approximately 1 in. high. In the presence of carbon tetrachloride, the greenish tinge imparted to the flame when the copper coil is held in place is of fairly brief duration. After the wire becomes red hot the test should be concluded. If carbon tetrachloride is present, the green color should be seen in less than 1 min after inserting the coil in the flame. The green color is best observed against a dark background. It is possible to estimate very roughly the extent of carbon tetrachloride in the atmosphere by noting the relative intensity of the green flame; a very brilliant flame indicating, of course, a high concentration. Use of a coil that has been cooled to room temperature before insertion in the flame is advised.

In order to familiarize oneself with the green color, pour a few drops of carbon tetrachloride in a drinking glass, or small glass container, and shake. Then heat the coil in the flame of the alcohol lamp after which insert it into the drinking glass for a second or two just above the carbon tetrachloride. Then put the coil back into the flame and a very intense green color will be seen. To make the actual test, discard this coil and use a fresh one as it is difficult to burn off the carbon tetrachloride.

This test must not be used where explosive vapors are present. To prevent the formation of phosgene, the flame from the alcohol lamp should not be allowed to burn in air containing large concentrations of carbon tetrachloride or other chlorinated hydrocarbons for a period longer than that necessary to perform the test.

Some Problems In Cast Iron

Some notes on a number of interesting problems in cast iron production are presented in this article by one of Europe's foremost cast metal metallurgists. In this, the first article written for an American technical publication by Dr. Piwowarsky in many years, the results of some wartime investigations covering hot blast cupolas, special melting units, rolled cast iron, heat and scale resistant and armored iron are discussed.

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By EUGENE PIWOWARSKY
Frankfort, Germany

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THE cupola, although greatly improved in the last few decades with respect to design and operation, still suffers under a disadvantage in that it is difficult or impossible to superheat the iron to temperatures above 2750°F, and that therefore the production of low carbon cast irons with adequate casting properties is possible only under considerable difficulties.

A special design of hot blast cupola, proposed by the author, has been tried in pilot and industrial plant operation here, and, although it is not new in type, the method of operation is rather singular in character. It is significant that the blast in these units is heated to temperatures between 660° and 1200°F in separately fired recuperators. By this method the coke charge can be reduced by 1 to 3 pct as compared with orthodox methods. However, in any event, the coke charge should not be lowered appreciably below 8 pct of the iron charge. It is also possible to melt the iron in a hot blast unit with a coke charge of about 6 pct, but in that case valuable constituents of the iron, particularly silicon and manganese, will be lost. Further, the charge will tend to stick and hang.

In the production of malleable cast iron the advantages of the hot blast cupola are so outstanding that this metal should always be produced in this way. Extensive tests conducted at the suggestion of the author by the Eisen und Stahlwerke of Georg Fischer in Schaffhausen, Switzerland, have yielded extremely valuable results which should be considered a standard for industrial operations. Malleable iron produced in the hot blast cupola can be annealed more easily and has a greater toughness and elongation for equal tensile strengths.

Recently the author, together with Georg Fischer in Schaffhausen, and Dr. Schack of Rekuperator K. G., Dusseldorf, has developed a new furnace combination for cases in which a higher coke charge than about 8 to 10 pct becomes necessary. Unique operating economies have been achieved by combining the original process of separate air preheating to about 750° to 1110°F with the burning of the CO-bearing gases above the furnace top.

A recuperator for preheating the blast, made of low alloy steel or moderately alloyed cast iron, is adequate for hot blast temperatures between 570° and 750°F. If higher hot blast temperatures are applied, highly alloyed heat exchanger tubes must be used for the recuperator, which would make the installation very expensive. Since water cooling will be required in the fusion zone under these conditions, the whole plant becomes complicated and expensive and needs most careful attention.

During the past few years the author has attempted to create an entirely new cupola which might mean a complete revolution in cupola melting. Unfortunately the tests begun in Germany have not been continued because of present conditions here and have been restricted to pilot plant operation. The principle of the new method of operation is shown in fig. 1. Alongside the cupola is a shaft which takes the coke charge as soon as it exceeds 3 to 6 pct of total coke consumption. By separate combustion of the coke used in excess of this percentage, in a special shaft, a possibility is presented for using practically any coke addition in excess of 3 to 6 pct, and to burn the coke completely to CO_2 without any considerable reduction of CO_2 to CO taking place in the upper part of the cupola shaft. A similar construction was proposed many years ago. At that time an attempt was made to burn all the coke in an auxiliary shaft, but this was impossible for a variety of reasons.

The new type of furnace requires some special changes in the manner of applying the blast and an accurate adjustment of the size of the coke to the blast temperature. Also, the combustion zone in front of the tuyeres must be such that it can be made longer or shorter, depending on the adjustment of the burner and the operating conditions. Fig. 2 shows this new type of cupola as it was modified on the basis of the experience gained in operating the furnace arrange-

ment shown in fig. 1. This modified furnace combination (fig. 2) consists of a large combustion chamber, a cupola and a forehearth in between. The cupola can be operated as required with a part of the coke charged and has, in that case, special blast ports. Further experiments with this type of furnace appear to be most promising.

Heat and Scale Resistant Iron

Heat and corrosion resistant cast iron alloys with between 5 and 7 pct Si, and alloys with 7 to 11 pct Al, have been produced up to now in electrical furnaces. Test runs have established the fact that the cupola is capable of producing a silicon-rich casting with 5 to 6 pct Si. This material has good tensile and service properties. It is very dense and can withstand service conditions in an oxidizing atmosphere at a temperature of 1740°F. Melting must, however, be performed very carefully, the iron must be cooled to a definite casting temperature and gases must be allowed to escape from the liquid iron. This practice results in tensile strengths of 20,000 to 31,300 psi at a wall thickness of 1.4 to 2 in. Additions of 0.5 Al were found satisfactory but 1 pct Al proved to be excessive. This iron can be worked very well, its volume stability is very good and losses under a scaling test are very small.

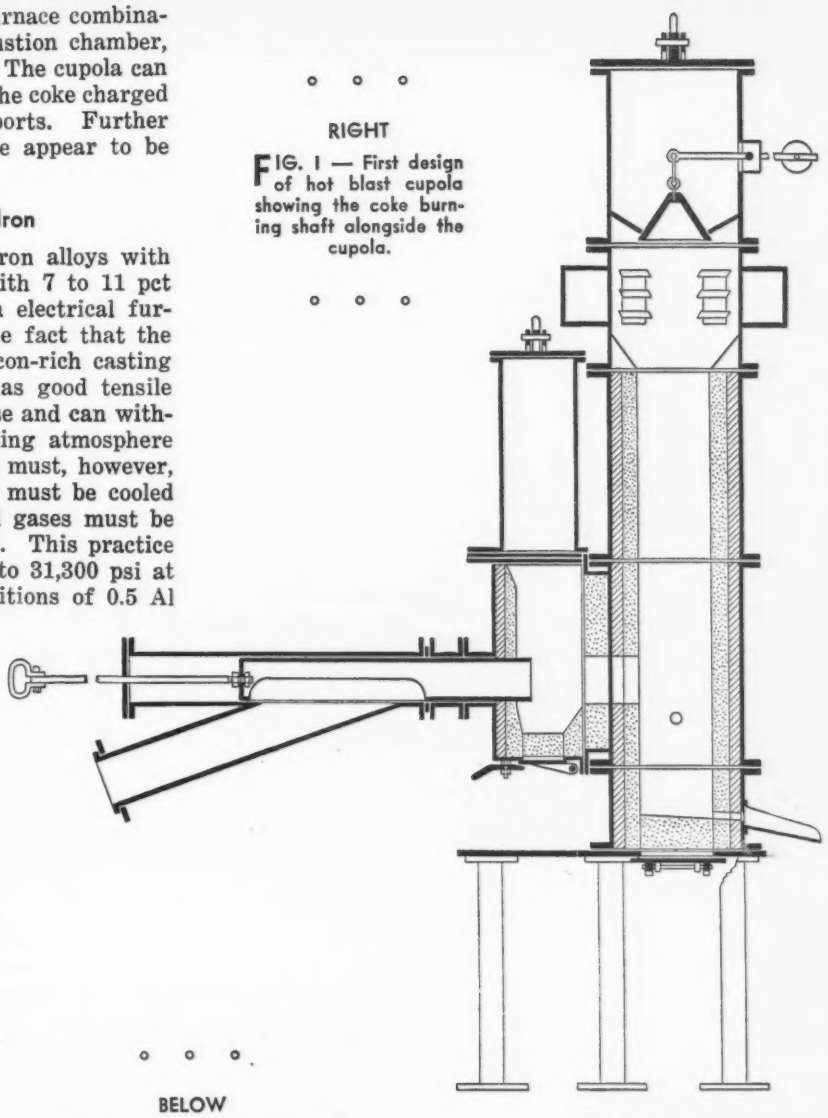
Alloys with 7 to 11 pct Al become very hard, brittle and cannot be machined. This feature is proportional to the extent to which aluminum exceeds 7 pct. If, however, 3 pct Si is added to a cast iron containing about 8 pct Al, a machinable iron is obtained, as recent tests by H. Ulitzsch have shown.

Hot Working of Cast Iron

Hot forming of cast iron requires that the cast iron be white or white with graphitic carbon and possibly ferritic areas. As soon as small amounts of primary or eutectic graphite occcur, the possibility for hot working decreases rapidly. The author has reported extensively elsewhere on the numerous applications for rolled cast iron in machine, bridge, ship and railroad construction and also in piston rings and cylinder linings of the highest quality.

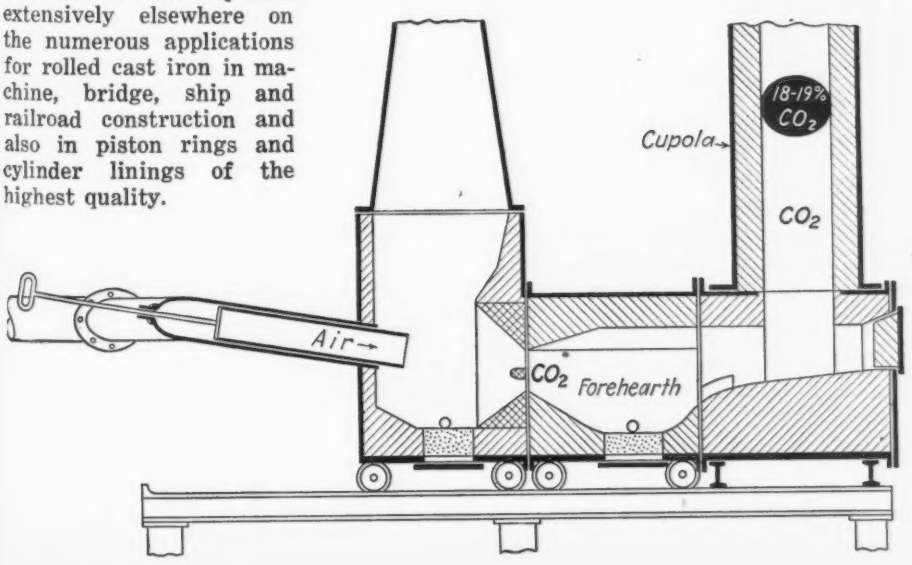
RIGHT

FIG. 1 — First design of hot blast cupola showing the coke burning shaft alongside the cupola.

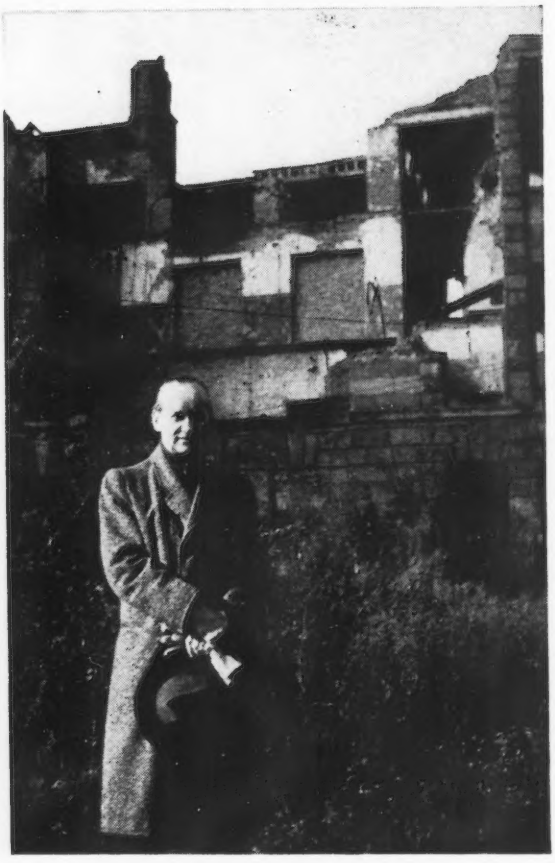


BELOW

FIG. 2—Modified arrangement of hot blast unit, based on experiences gained in operating the unit shown in fig. 1.



Rolling requires precise maintenance of an optimum rolling temperature, keenly attuned to the chemical composition, and accurate reductions in rolling which generally must not exceed 15 pct per pass. Table I shows the limits within which strength properties may vary in relation to the chemical composition, the original structure and the heat treatment. Considerable experience is necessary to obtain the desired success in hot rolling of cast iron. However, if prescribed conditions are adhered to, a material can be obtained which combines high strength (85,000 to 140,000 psi, tensile) with an elongation of 1 to 6



A RECENT photograph of the author taken by the European Editor of THE IRON AGE. The hole in the building in the background was Dr. Piwowarsky's office and laboratory.

pct and low notch sensitivity as well as good damping properties, excellent corrosion resistance and very good service properties as bearing metal, piston rings or bushings. Cast iron sheets, assembled into a welded construction, result in quiet service without vibrations. This type of structure is expected to prove itself in machine tool construction. In the long run, rolled cast iron is likely to prove superior to the best steel in competition as ship plate, bridge parts, railroad ties, automobile sheets and many other products. However, it will be necessary for industry to undertake extensive research to achieve this success.

Cast iron with steel inlays has been tried frequently. The fundamental problem is that of the intimate welding of the inlay with the cast iron. The author has proposed a steel with about 2 to 3 pct Si and 0.4 to 0.6 pct C for this purpose. This material has proved itself, as it forms a soft gradient between the steel and cast iron and increases the fracture resistance of the combination to an extraordinary degree. The greatest difficulty encountered in armoring steel with cast iron lies in the correct and accurate positioning of the steel in the casting form. While the author has solved this problem in principle, at this time only rather simple castings can be made in this manner. In Russia a good deal of attention is being devoted to the problem of armored cast iron.

Rolling Brittle Cast Alloys

The author has begun a few fundamental experiments to determine whether the brittle alloys, such as silicon and chrome cast irons, are not also deformable at an elevated temperature. These experiments are based upon the experiences obtained in the rolling of cast iron. All these special alloy cast irons, although they are very brittle at room temperature and somewhat above, become increasingly susceptible to plastic deformation above 750° to 950°F. Further tests under suitable conditions certainly permit the development of new possibilities of application of these alloys.

Special Melting Units

Recently, in addition to the electric furnace, the induction furnace has been used for melting and remelting cast iron. Excellent success has lately been obtained in Germany with the use of a low frequency electric unit. A combined cupola-high frequency furnace, proposed by the author, promises revolutionary results in regard to purity, degasification, superheating and independence from the chemical composition. This high frequency type cupola does not consist of a cupola with an induction furnace forehearth, but rather the whole crucible of the shaft type furnace has been made into an induction furnace. This type of furnace should yield the most valuable specialty products for the manufacture of piston rings, cylinder liners and high quality special cast irons.

Even the small selection of problems of the cast iron field shows that there is a large field open to research in foundry practice. The modern high quality cast iron will be able to increase its sales and its range of application if the necessary initiative is taken by leaders in the foundry industry.

TABLE I
Some Data on Effects of Rolling Cast Iron

MATERIAL	COMPOSITION					STRUCTURE		Tensile Strength psi, 000	Elongation, Pct	Hardness, Kg per sq mm	Rolling Temp, °F	Deformability
	C	Si	P	Mn	S	Before Rolling	After Rolling					
1	3.36	2.39	0.6	0.7	....	Gray pearlite	Pure ferrite	....	....	....	1785–1740	Bad
1a	3.10	2.45	0.6	0.7	....			....	....	....		
2	1.70	1.80	0.1	0.8	0.04	Pearlite (ferritic areas)	Pearlite	147.9	0.45	306	1740	Good
Malleable												
3	2.20	2.20	0.1	0.6	0.02	Mottled	Gray	125.1	2.85	278	1740	Good
Chilled Iron												
4	2.98	0.68	0.08	0.7	0.09	Pearlitic	Pearlitic	144.5	5.2	288	1740	Good
Malleable												
5	1.71	1.70	0.09	0.8	0.04	Ferritic areas	Pearlite and ferrite	147.6	8.4	326	1740	Good
6	2.48	1.24	0.46	0.48	....	White	Gray	28.4–110.9	....	410	1700	Good
7	3.15	0.79	0.48	0.58	....	White	Gray	39.8–71.1	0–1.5	227	1740	Bad
8	2.46	2.64	0.21	0.53	0.03	Gray Pearlite	Ferrite	39.8	0.5	....	1740	Very bad

Fabrication of the Japanese Samurai Sword

THE unusual techniques employed in the production of Japanese Samurai swords are described by S. V. Grancsay, curator of arms and armor, Metropolitan Museum of Art, New York, in the September-October 1946 issue of *Army Ordnance*. The blade, with its extremely hard and keen edge and relatively soft body, was forged from billets upon an anvil with artistic skill and judgment, in an operation that required about 60 days working from dawn to late at night.

Many different methods were employed in building up the billet from which the blade was finally forged, and the preparation of the constituent pieces is in itself a fine art. In one method, plates of iron and steel were welded together. The resulting single plate was notched across the middle, folded on itself, welded together, and drawn out under the hammer to its original size. This process was repeated from 12 to 18 times, resulting in a billet containing many thousand of layers of alternate iron and steel. In some cases, several billets were prepared, welded together, folded and hammered to the desired size.

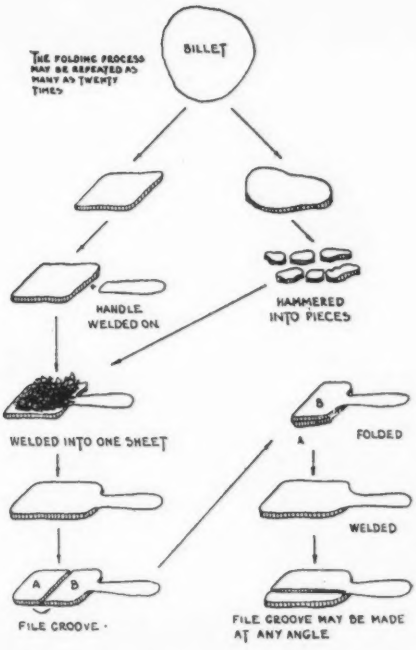
Another type of constituent piece is made of a sheet of steel to which fragments or needles of similar but harder steel are welded, a process which resulted in producing the isotropic structure of the steel, see fig. 1. (The harder steel is made by throwing a sheet of steel into water while hot, then hammering it into pieces). As many as 15 lumps of steel averaging 1½ lb apiece may be required to make a blade weighing 1½ to 2 lb when finished.

Each of the small bits of steel is inspected before being used. If its edge of fracture is dense, granular and homogeneous in structure and of a dull gray color, the steel is regarded as good. If on the other hand, the edge of fracture is cracked, glistening, and of uneven color, the bit of steel is rejected.

Another kind of compound blade, shown in fig. 2, was built of steel only but of three varieties carefully selected so that each should possess the physical properties required in that part of the blade for which it was to be used. Thus the bar from which the blade had to be forged was built up and welded in such a way that one kind of steel formed the inner body or core; another, the sides (skin or cover steel); and a third, the edge. The edge steel consists of 1,048,576 layers, the core steel 256 layers, and the skin steel 3,151,944 layers.

These three types of steel are finally welded together. Square pieces of core and edge steel are placed side by side, and a sheet of skin steel of the size of the core and edge steel together is placed over them. This is hammered into a rectangular piece, cut in two, and turned over so that the skin steel comes on the surface. This is hammered down into a blade—over eight million layers having been welded and stretched out at the edge, fig. 2.

The edge and point are the critical areas. After the blade is forged, it is given a special heat treatment whereby the carbon and silicon content at the edge is increased, thereby making the edge harder than the rest of the blade. An interesting point is that the tempering was usually accomplished during the eighth or the second month of the year, for at these times water was considered most suitable for hardening the edge, hence when a blade is dated and the month also given, it is usually the eighth or the second.



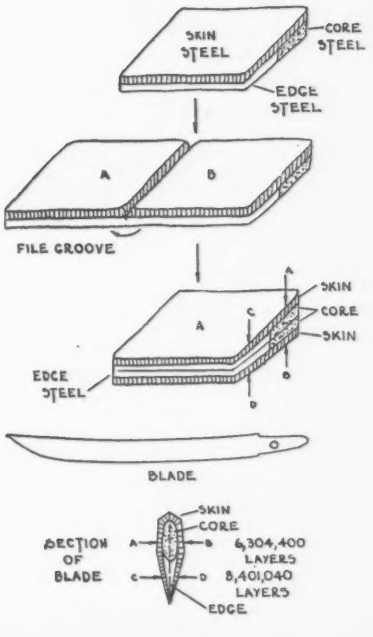
LEFT

FIG. 1—The process of welding the folded sheet can be repeated many times so as to result in many thousands of layers of alternate iron and steel.

o o o

RIGHT

FIG. 2—Three distinctive types of steels are welded together, folded and re-welded, into a blade containing many millions of layers.



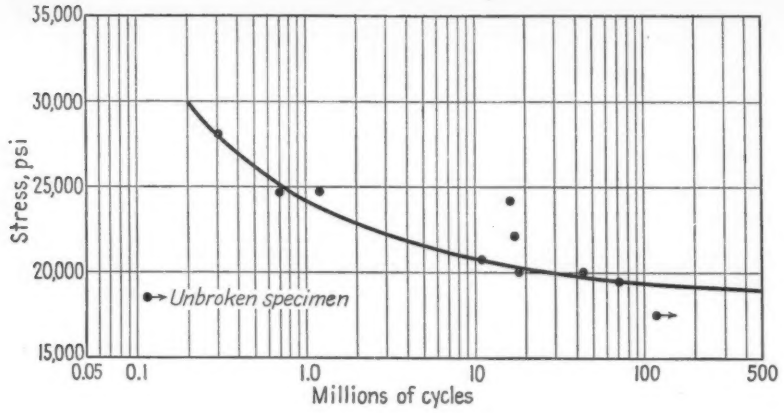


FIG. 1—SN fatigue curve for a set of unpeened unnotched bars used as a standard in the tests. Bars were 0.18 in. diam and were tested at 9000 rpm. Endurance limit was 19,000 lb per sq in.

Influence of Shot Peening on Fatigue

SHOT peening of 14ST aluminum alloy[1] can mean increases in life as high as 80 times that of unpeened stock when standard unnotched Krouse bars are used and gains of more than 32 pct in fatigue strengths at 100 million stress reversals in the case of notched samples. These data were established recently by an investigation at the Thomson Laboratory, Lynn, Mass., of General Electric Co. The data should, however, be considered of indicative value only, and a suitable basis for further work, since there was a considerable amount of scatter, as shown in tables I and II during the researches.

The work reported here covers attempts to measure the increase in fatigue strength of the 14ST alloy resulting from shot peening standard notched and unnotched Krouse fatigue bars. The tests of unnotched specimens indicate that the number of cycles to failure at a specific stress above the endurance limit may be increased by shot peening under optimum conditions to 80 times that of unpeened test bars.

TABLE I

Fatigue Values of Unnotched 14ST Test Bars at Various Peening Pressures and Times

Gage Pressure, lb	Peening Time, min	Speed During Peening, rpm	Cycles to Failure ($\times 10^6$)
52	0.1	1200	2.334
52	0.3	1200	0.741
52	0.3	100	0.980
52	0.5	1200	2.950
52	1.0	1200	7.736
80	0.3	1200	17.286
80	0.5	1200	26.590

The tests of notched specimens showed an increase in fatigue strength by shot peening under optimum conditions from 17,000 psi to over 22,500 psi at 100 million stress reversals, a gain of more than 32 pct.

The materials used in the tests were slabs of 14ST alloy 6 x 6 x 1 in., specially forged to have directional grain flow, and all specimens were machined so that their longitudinal axis would be parallel to the direction of grain flow. The tensile properties of the material were:

Yield strength (0.2 pct perm. ext.) .63.250 psi
Tensile strength .....70,000 psi
Elongation in 2 in.....14.5 pct

Tests of Unnotched Bars

A set of unpeened 0.18 in. diam fatigue bars was first tested in a Krouse fatigue machine at about 9000 rpm. An SN curve (stress v. number of cycles of stress reversals to failure) was plotted to be used as a standard. This SN curve is shown in fig. 1. In order to determine the best time and pressure for shot blasting 14ST alloy to improve most effectively its fatigue strength, seven Krouse 0.18 in. diam bars were shot peened with No. 26 steel shot, using a 5/8-in. nozzle, while rotating 3 in. from the nozzle.

The bars were then run in Krouse fatigue testing machines at a stress of 27,952 psi and the number of cycles to failure determined. The gage pressure during shot peening, the time of peening, speed of rotation during peening, and the number of cycles to failure are shown in table I.

From the SN curve in fig. 1 it is indicated that the

[1] *See also "Shot Peening Effect on Aluminum,"* THE IRON AGE, *Dec.* 27, 1945; *an extended discussion of shot peening and its effect on fatigue values is contained in the article "Strengthening Metal Parts by Shot Peening,"* THE IRON AGE, *Nov.* 28 *and Dec.* 5, 1946.

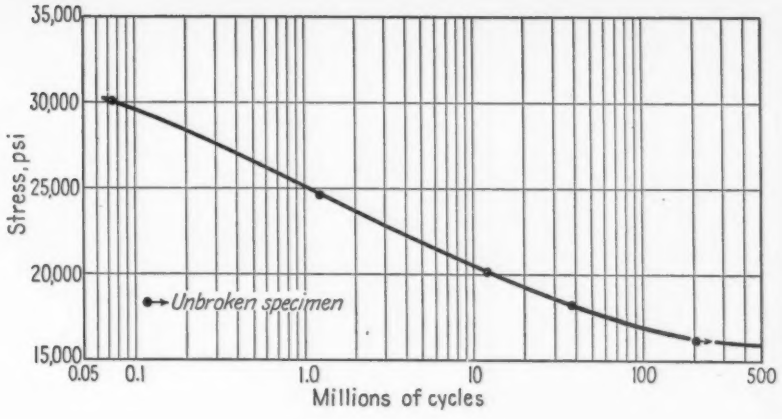


FIG. 2—SN curve for a series of unpeened notched bars of 0.375 in. diam and with a 1/16-in. radius groove. Endurance limit was 16,000 lb per sq in.

Strength of 14ST Alloy

By C. B. GLEASON
Thomson Laboratory, General Electric Co., Lynn, Mass.

Results of an investigation to determine the effect of shot peening on the fatigue strength of 14ST aluminum alloy are discussed in this article. Tests on unnotched specimens indicated possibility of increases in life of as much as 80 times that of unpeened material, while notched specimens showed more than 32 pct improvement in fatigue strength.

number of cycles to failure for unpeened specimens at a stress of 27,952 psi is approximately 0.25 x 10^6. It appears, therefore, that the number of cycles to failure has been increased by shot peening from a minimum of threefold to a maximum of 100 times.

Since 80 lb. gage pressure (table I) was obviously superior, it was considered advisable to test a larger number of bars peened at that pressure to establish the optimum peening time. This second set of peened specimens was also tested at a stress of 27,952 psi. The results are shown in table II.

These results indicate that the optimum shot peening time at 80 lb gage pressure is about ¾ min. when the number of cycles to failure is approximately 20 x 10^6, representing an increase of 80 times that of unpeened specimens.

Tests of Notched Bars

Since the test values just discussed were somewhat erratic, it was thought that testing notched specimens might lead to more consistent results. Twenty fatigue bars, 0.375-in. diam, were prepared from the same 14ST stock and a 1/16 in. radius groove was machined at the center of each with a root diameter at the groove of 0.25 in. Eight of these bars were shot peened with No. 26 shot in and around the groove at 55 lb gage pressure for different periods of time, six bars were peened at 80 lb gage pressure, and six bars were left unpeened for comparison.

The unpeened bars were first tested in a Krouse fatigue machine at varied increments of stress and an SN curve drawn (fig. 2), which showed a fatigue strength of 17,000 psi at 100 million cycles and 16,000 psi at 500 million cycles. From this curve it was decided to test all of the shot-peened specimens at a stress of 22,500 psi, at which stress the SN curve showed the number of cycles to failure for unpeened specimens to be 3.5 x 10^6. The results of these tests are shown in table III.

The tests of the bars peened at 55 lb gage pressure

TABLE II

Fatigue Tests of Unnotched 14ST Test Bars at 80 Lb Gage Pressure to Determine Optimum Peening Time

Peening Time, min	Cycles to Failure, x 10^6	
	Test A	Test B
0.3	4.830	17.286*
0.5	10.167	26.590*
0.8	18.187	22.620
1.2	7.470	8.365
1.6	5.289	6.393
2.0	12.581	.....

* From table I

were somewhat erratic, while those at 80 lb were reasonably consistent. Again it will be observed that the beneficial effects of shot peening were more pronounced at the higher pressure. Since each of the test specimens that were shot peened for 1 min at 80 lb gage pressure were still sound after more than 100 million reversals, it can be concluded that the fatigue strength has been increased from 17,000 psi to more than 22,500 psi at 100 million reversals, an increase of more than 32 pct.

Unfortunately, it seems quite impossible to measure the benefits of shot peening in vitiating the harmful effects of scratches and other surface imperfections on the endurance limit, although this seems to be one of the chief advantages of the practical application of peening.

TABLE III

Fatigue Tests on Peened Notched 14ST Test Bars at Various Peening Pressures and Times

Gage Pressure, lb	Peening Time, min	Cycles to Failure, x 10^6	
55	0.1	2.409	3.054
55	0.5	15.311	29.439
55	1.0	0.091	13.295
55	1.5	29.207	58.304
80	0.1	24.874	19.676
80	0.5	62.172	34.803
80	1.0	102.840†	104.054†

† Unbroken Specimens

German Wartime Technical Developments

REPORTS of German practice in numerous technical fields of interest to engineers and executives in the metalworking field, issued recently by the Office of Technical Services, Washington, are briefly described below. These reports are in addition to detailed articles of certain phases of German practice previously published in THE IRON AGE. Copies of the reports listed below may be obtained in either photostat or microfilm form, as indicated. Orders for copies of these Reports should be addressed to Office of Technical Services, Department of Commerce, Washington 25, D. C., giving the "PB" identification number. See THE IRON AGE, June 27, p. 67, Aug. 29, p. 39, Sept. 26, p. 80, Oct. 10, p. 80, Oct. 10, p. 67, and Nov. 14, 1946, p. 81, for a list of earlier reports.

Turbine Alloy—Substitute heat and creep-resistant alloys were used successfully by the Germans during the war in the construction of gas turbines and jet propulsion engines, according to this British report. The report describes composition and heat treatments of the various alloys developed, and the methods and machines used for testing them. It also includes drawings of aircooled blades; tables and graphs showing yield, tensile, and creep strengths of the alloys, as well as their tempering, forging, and annealing temperatures. *PB-28557; photostat, $6; microfilm, $2; 89 p.*

New Engine—A new engine, claimed by a German scientist to consume less than 1/3 lb of fuel per hp-hr, may be useful for operating ships, locomotives, and long range aircraft, according to this British report. The report contains a general discussion of the theoretical thermodynamic process of the engine, but offers no specific mathematical solution or proof of the theory. In its simplest form, the engine consists of a turbo-compressor, a turbine and a regenerator. *PB-25329; photostat, $2; microfilm, 50¢; 30 p.*

Aircraft Metals—Standards for steel and aluminum alloys used in German aircraft are given in this collection of German metallurgical research papers. Collection, in German, includes photographs, drawings and tables microfilmed by American investigators at the Messerschmitt plants in Oberammergau and Garmisch-Partenkirchen. *PB-2428; photostat, $43; microfilm, $6.50; 636 p.*

Capacitors—Detailed information on German process for manufacturing metallized paper capacitors that are said to be better, cheaper and smaller than the conventional foil-and-paper types now used in electronic equipment is contained in this British report. *PB-39361; 58 p. May be obtained from Hobert Publishing Co., Box 4127, Chevy Chase Station, Washington 15, D. C., $3 a copy. A briefer report on the same subject, PB-421; 6 p., mimeographed, 10¢, is available from OTS.*

Compressors and Fans—Comprehensive information on theory and practice of German aircraft compressor and fan design is contained in a series of 22 reports. Reports consist chiefly of translations of research papers prepared by members of a research group working under Dr. Bruno Eckert, Stuttgart Technical High School. Names and identification of each of these papers may be obtained by writing THE IRON AGE.

Printing Plates—Bimetallic printing plates developed in Germany, said to be good for more than 1 million impressions in printing bank notes, described in this report. The plates are made of brass with nickel-steel electro-deposited over the nonprinting areas. Report also covers other phases of German printing industry. *PB-34044; photostat, $4; microfilm, $2; 59 p.*

Diesel Engines—Forty-two German developments in diesel engine injection equipment for automotive, stationary and marine engines described in this report. Design, construction and materials used in many of the devices are said to be new, although they do not differ in principle from standard diesel injection equipment in the United States. *PB-41063; photostat, $21; microfilm, $7; 313 p.*

10,000 Trade Names

. . . A second section of the Trade Name Directory, compiled by The Iron Age as a ready reference for engineers and business executives, is presented herewith. The first section of this directory appeared in the Annual Review Issue of Jan. 2, p. 172. This directory tells what a trade name covers, its composition if a material, where or how it is used and the full address of the manufacturer or supplier.

Cyanobrite: Red powdered mercury salt, soluble in acids and alkalies, used as the mercury-carrying ingredient for zinc-plating solutions. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Cyanogran: White solid fused in 1-oz eggs and in granular form; for heat treating steel; in electroplating; in cleaning of metal, including neutralizing after pickling; and in the extraction of gold, silver, zinc and lead from ores. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Cyclematic: Vertical broaching machines. Oilgear Co., Milwaukee 4.

Cycleweld: Plastic adhesive for metal-to-metal or metal-to-nonmetal joints. Chrysler Corp., Detroit.

Cycle Progress: Synchronous motor-driven timing device with single-pole double-throw switching action on automatically controlled operation. Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44.

Cycloidal: Pumps. Roots-Connersville Blower Corp., 18th & Columbia Sts., Connersville, Ind.

Cyclone: Series of gas, oil and electric furnaces for hardening, tempering, brazing, nitriding of ferrous and nonferrous metals. Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12.

Cyclone: Dust collectors. Kirk & Blum Mfg. Co., 2873 Spring Grove Ave., Cincinnati 25.

Cyclops: Needle bearings. Roller Bearing Co. of America, Whitehead Rd., Trenton, N. J.

Cyclops Stainless: Corrosion-resistant 12-17 Cr stainless steel for cutlery, dies, engine parts, valves. Universal-Cyclops Steel Corp., Bridgeville, Pa.

Cylindron: Anvil for use with the Rockwell tester for supporting cylindrical work. Wilson Mechanical Instrument Co., 383 Concord Ave., New York 54.

Cypritic Steel: High-copper stainless steels; excellent drilling and machining characteristics. Everard Digby, 6 Queen Anne's Gate, Westminster, London S.W. 2, England.

— D —

D Nickel: Form of nickel possessing good mechanical properties at high temperatures. International Nickel Co., 67 Wall St., New York 5.

Dacar: Plain-carbon steel for general use. Jessop Steel Co., Washington, Pa.

Dacolyte: Assists in producing smooth copper deposits free from nodules or trees. For acid copper plating solutions for heavy deposits only. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Dalzell Steel: Plain-carbon steel for machinery parts. Colvilles, Ltd., Glasgow, Scotland.

Dairywhite: Nickel-silver castings. Arthur Harris & Co., 214 N. Aberdeen St., Chicago.

Damascite: Molded iron-powder parts. Chrysler Corp., Amplex Div., Harper & Mt. Elliott, Detroit 31.

Damascus: Copper alloy for bearings. National Bearing Div., American Brake Shoe Co., 5002 Manchester Ave., St. Louis.

Damaxine: Phosphor-bronze chillcast solid and cored rods; ingots and castings. Manganese Bronze & Brass Co., Ltd., Ipswich, England.

Damaxine Bronze: Copper-tin alloy for bearings, slide valves, worm wheels. Manganese Bronze & Brass Co., Ltd., London, England.

Damit: Waterproof joint-sealing compound for water, air, gas and low-pressure lines. Quigley Co., Inc., 527 Fifth Ave., New York 17.

Damtite: For sealing seams in bearing shells; prevents molten metal from seeping out when lining a bearing. United American Metals Corp., 200 Diamond St., Brooklyn 22.

Dando: Dry-pressed ladle, runner and hot-top brick, mold plugs, sleeves and nozzles, special shapes. McLain Fire Brick Co., Gulf Bldg., Pittsburgh.

Darco: Activated carbons for continuous purification of electroplating solutions. Darco Corp., 60 E. 42nd St., New York 17.

Dark Tempering Oil: Heavy-bodied oil suitable for general tempering work when temperatures in the bath do not exceed 460°F. Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago 80.

Darsil: Grayish powder, insoluble in water and soluble in conc. hydrochloric-acid solutions. Used for oxidizing (black finish) on silver, gold and brass. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Dart: Malleable iron pipe unions—two bronze seats ground to true ball joint. E. M. Dart Mfg. Co., Providence 5, R. I.

Dasco: Grinding and tempering oils. D. A. Stuart Oil Co., 2727 S. Troy St., Chicago 23.

Dascolene: Mineral-lard cutting oils. D. A. Stuart Oil Co., 2727 S. Troy St., Chicago 23.

Davenport: Foundry molding machines. Davenport Machine & Foundry, 3202 Lamp St., Davenport, Iowa.

Davis Metal: Copper alloys with 25-30 Ni, Mn, Fe, Pb, Si for valves, turbine blades and fittings. Chapman Valve Mfg. Co., Essex St., Indian Orchard, Mass.

De-Ion: Fuses, relief gaps, contractors, switches and circuit breakers. Westinghouse Electric Corp., East Pittsburgh.

de Lavaud: See Super-de Lavaud. United States Pipe & Foundry Co., Burlington, N. J.

De-Scaler: Scale remover for industrial cooling systems. Turco Products, Inc., Los Angeles 54.

Deburrmaster: Metal polishing and finishing equipment. Lupomatic Tumbling Machine Co., Inc., 4510 Bullard Ave., Bronx, N. Y.

Deemer: Steel castings. Deemer Steel Casting Co., New Castle, Del.

Deepfreeze: Industrial chilling machine for laboratory testing of materials and instruments and the storing of biologicals; metal chilling for shrink fitting, stabilization of castings, the increase of tool hardening and life. Deepfreeze Div. Motor Products Corp., 2301 Davis St., North Chicago, Ill.

Deep-Pan: Apron conveyors. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Defender Metal: 80 to 83 Pb, 5.5 to 7.5 Sn, 10 to 12 Sb, no Zn or Al. Tough, malleable lead-base substitute for regular tin-base babbitt. Magnolia Metal Co., 120-130 Bayway, Elizabeth, N. J.

Defiheat: Corrosion and heat-resistant high-Cr stainless for furnace parts and resistance to heavy corrosion. American Rolling Mill Co., Baltimore, Md.

Defirust: Straight-chrome stainless steels for turbine blades, valves, nitric acid equipment and stainless applications. American Rolling Mill Co., Baltimore, Md.

Defirust Machining: Free machining stainless steel with 13 Cr, for bolts, nuts, screw machine products. Rustless Iron & Steel Corp., 1001 Edison Highway, Baltimore 13.

Defistain: 18-8 stainless for corrosion-resistant parts, valves, chemical apparatus. American Rolling Mill Co., Baltimore, Md.

Delhi: Corrosion-resistant 17 Cr stainless iron for general anticorrosion service. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Delhi Iron: 17 Cr stainless iron for roofing, autobody sheets. Allegheny-Ludlum Steel Corp., Brackenridge, Pa.

Delco-Oils: Core and foundry oils and washes for every purpose. Cities Service Oil Co., Bartlesville, Okla.

Delloy Metal: Metal-cutting tools; general purpose cast alloy and carbides, hard-facing rod; precision castings. Delloy Metal Corp., Erie Ave. at K St., Philadelphia.

Delloyd: Hard-facing welding electrodes. Delloy Metals Corp., Erie & K Sts., Philadelphia.

Delsteel: Hand and pneumatic chisels, rivet sets, paving breakers, punches and dies. Delaware Tool Steel Corp., Wilmington 99, Del.

Delta: Foundry mold washes and coatings, core compounds, etc. Independent Foundry Supply Co., 2325 E. 38th St., Los Angeles 11.

Deltabeston: Electrical wires and cables. General Electric Co., Schenectady, N. Y.

Delta Antifriction Metal: Copper alloy to line bearings, bolts, nuts, castings. Phosphor Bronze Smelting Co., 2200 Washington Ave., Philadelphia.

Delta Metal: 60 Cu, 35 Zn with Pb, Sn, Fe, P for condenser tubes, column supports. Delta Metal Co., Ltd., London, England. Phosphor Bronze Smelting Co., 2244 Washington Ave., Philadelphia.

Delta Bronze: Corrosion-resistant copper-zinc-iron-tin alloy for chemical equipment, worm gears, bearings. Delta Metal Co., Ltd., London, England.

Delta Bronze: Corrosion-resisting copper alloys high in Zn with Fe and Sn for tubes, fittings, automobile parts, gears, valves. Delta Metal Co., Ltd., London, England. Phosphor Bronze Smelting Co., 2200 Washington Ave., Philadelphia.

Deltoid: Copper alloy used for hardware. Delta Metal Co., Ltd., London, England.

Dentalloy: Non-shrinking high-bismuth alloy for dental castings. Cerro de Pasco Copper Co., 40 Wall St., New York.

Deoxidine: Phosphoric acid metal cleaners for preparing steel, aluminum, brass, copper, etc., for painting. American Chemical Paint Co., Ambler, Pa.

Deoxoloy: Deoxodizer for brass and bronze. Alloys & Products, Inc., Oak Point Ave. & Barry St., New York.

Deoxylyte: Acid addition agents used to counteract the alkalinity of hot-rinse baths in the final preparation of cleaned metal surfaces for painting. American Chemical Paint Co., Ambler, Pa.

Depolarized Nickel Anodes: Rolled anode with dense structure containing 99 pct plus Ni. International Nickel Co., Inc., 67 Wall St., New York 5.

Despatch: Ovens for enamel baking, japanning, plaster mold drying, etc.; furnaces for annealing, bluing, forging, normalizing, tempering, tool hardening, etc.; air heaters; laboratory furnaces; circulating (up to 1600°F) and exhaust fans. Despatch Oven Co., 602 Southeast 9th St., Minneapolis 14.

Detrick: Insulations, cement, etc. M. H. Detrick Co., 113 W. Washington St., Chicago 2.

Detroit: Electric hoists and cranes. Detroit Hoist & Machine Co., 8208 Morrow St., Detroit 11.

Devereux: Mechanical agitators. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Devil Tools: Alloy-steel tools. Warren Tool Corp., Warren, Ohio.

De Vilbiss: Spray equipment, exhaust syems, air compressors, hose and connections. De Vilbiss Co., Toledo 1.

D-H: Series of heat resistant alloys containing Ni, Cr, Mn, Si, bal. Fe, for resistors, glass to metal seals, spark plugs. Driver-Harris Co., Harrison, N. J.

Di-Acro: See Die-Less. O'Neil-Irwin Mfg. Co., 382 Eighth Ave. S., Minneapolis 15, Minn.

Dialoy: 50 pct bismuth with lead, tin and cadmium; for dental tooth impressions, dental bridge work. J. M. Ney Co., 9 Elm St., Hartford.

Diamantbronze: 58 Cu brass with Ni-Mn-Al-Fe, for valve gage fittings. Ostermann & Co., Metallwerke, Cologne, Germany.

Diamite: Abrasion-resistant white iron with 4 Ni, 1.5 Cr, Si-Mn, for liners in chutes, sand pump parts. Weatherly Foundry and Mfg. Co., 36 Kistler Ave., Weatherly, Pa.

Diamond: Steel floor gratings. William F. Klemp Co., 6613 S. Melvina Ave., Chicago.

Diamond: Drop forgings. Kropp Forge Co., 5303 W. Roosevelt Rd., Chicago 50.

Diamond: Stainless alloys for heavy anti-corrosion service. Sivyer Steel Casting Co., 1675 S. 43rd St., Milwaukee.

Diamond: Fire brick for steel and copper melting furnaces. Quigley Co., Inc., 527 Fifth Ave., New York 17.

Diamond: Lawn fence. American Steel & Wire Co., Cleveland 13.

Diamond Blue: High-speed steel reamers. Pratt & Whitney, West Hartford 1, Conn.

Diamond Chains: Steel roller chains, standard and conveyor type; machine steel and cast iron sprocket wheels to operate with chains; flexible shaft couplings. Diamond Chain Co., Inc., 402 Kentucky Ave., Indianapolis 7.

Diamond Grip: Rolled steel floor plate. Pine Iron Works Co., Commercial Trust Bldg., Philadelphia 2.

Diamond R Files and Hones: Product embodying new process of bonding diamond grits to carbon steel; easily adapted to unusual shapes and sizes. Wendt-Sonis Co., Hannibal, Mo.

Diamond Sandblast Sand: Washed-dried and screened silica sand, rounded in characteristics, and especially screened to certain size and used for sandblasting. Ottawa Silica Co., Ottawa, Ill.

Diamond Sand Blast: Mineral abrasives for blast cleaning. Ottawa Silica Co., Ottawa, Ill.

Die-Less: Bender-shear-brake method of metal duplicating without dies. O'Neil-Irwin Mfg. Co., 382 Eighth Ave. S., Minneapolis 15, Minn.

Die Slick: Lubricant for diecasting dies and permanent molds. G. W. Smith & Sons, 5400 Kemp Rd., Dayton.

Diesel Marine: Babbitt for high-powered diesel engines. United American Metals Corp., 200 Diamond St., Brooklyn 22.

Dieweld: Special hard-facing welding electrodes. American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.

Diex: X-ray apparatus. Westinghouse Electric Corp., East Pittsburgh, Pa.

Diglycol Stearate C: Emulsion in combination with paraffin wax producing water-repellent coating for aluminum, zinc and tin liable to attack by water condensation. Glyco Products Co., Inc., 231 King, Brooklyn.

Di-Hard: Boron-containing cast iron for cylinder liners for slush pumps, etc. Industrial Research Laboratories, Ltd., Oil Well Supply Co., Los Angeles 15.

Dippit: Lead with 5 Sn, 0.5 Cu, for high-melting solders. United American Metals Corp., 204 Diamond St., Brooklyn.

Dial Type: Medium to large size knee and column type milling machine for general purpose milling operation. Cincinnati Milling Machine Co., Marburg Ave., Cincinnati.

Dickerman: See Hitch Feed and Die Feed.

Die Feed: Automatic punch press feed, attached to either bolster plate or die-set and used with coiled stock; 3 and 6 in. model, takes material up to 3/16 in. thick. H. E. Dickerman Mfg. Co., 321 Albany St., Springfield, Mass.

Dilectene: Synthetic thermoplastic resin which resists temperatures up to 160°F. Molded parts for radio, television and aircraft parts. Continental Diamond-Fibre Co., Newark, Del.

Dill: Traveling head slotter. Lobdell Co., Wilmington 99, Del.

Dillon: Dynamometer in nine capacities, from 500 to 20,000 lb. W. C. Dillon & Co., Inc., 5420 W. Harrison St., Chicago 44.

Di-Metal: Zinc-base alloys for diecasting and for short-run dies. Federated Metals Co., 120 Broadway, New York.

Disc-Center: Heavy-duty, power-driven brushing wheels for removing weld scale, paint, rust and corrosion and for cleaning and deburring castings, forgings, etc. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.

Discus: Sewed-pieced buff. F. L. & J. C. Codman Co., Rockland, Mass.

Disston Stainless: Straight-chrome stainless steels and irons for heat and corrosion-resistant parts. Disston & Sons, Inc., Unruh & Milnor Sts., Philadelphia.

Diverter-Pole: Motor generators used for the floating charge of batteries and for supplying normal direct current needs. Electric Products Co., Clarkstone Rd., Cleveland 12.

Dixie Bond: Bonding clay for foundry sands. Eastern Clay Products, Inc., Eifort, Ohio.

Dixisteel: Steel bars and shapes, reinforcing steel, cotton ties, rivets, wagon hardware tires, bands, cooperage hoop, wire, bale ties, wrought washers, fence, barbed wire, nails, welding rods, posts, gates and staples. Atlantic Steel Co., Atlanta 1.

Dixtampo: Yellow brass for hot forging and stamping. Delta Metal Co., Ltd., London, England.

Dixtrudo: Free-machining copper alloy for high-speed turning of rods, screws, nuts, bolts. Delta Metal Co., Ltd., London, England.

DN: Series of austenitic and ferritic nickel and Ni-Mn steels for non-magnetic parts and wires in electrical apparatus. Deutsche Edelstahlwerke A.G., Krefeld, Germany.

Do-Di: 60 copper-brass with low Sn-Pb-Fe-Al; for marine parts. Doehler Die Casting Co., Toledo.

Doler-Brass Alloy: 64 Cu brass with 1 Si, for brass diecasting. Doehler Die Casting Co., Toledo.

DoAll: Metal-sawing machines. DoAll Co., Minneapolis 4.

Doler-Zink: 3 Cu-4 Al alloy containing zinc for diecasting carburetors, valve parts, fuel pumps. Doehler Die Casting Div., Doehler-Jarvis Corp., Toledo.

Domal: High-purity magnesium and magnesium alloys. Dominion Magnesium, Ltd., 67 Younge St., Toronto, Ontario.

Double Circle: Twist drills, reamers and special tools. Chicago-Latrobe Twist Drill Works, 411 W. Antario St., Chicago 10.

Double-Duty: Sprocket wheels. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Double Flow: Horizontal induced-draft cooling towers used with large water-cooling applications. Marley Co., Inc., 3001 Fairfax Rd., Kansas City, Kans.

Double Jack: Wire stretchers. American Steel & Wire Co., Cleveland 13.

Double Jaw: Tap holder. Procunier Safety Chuck Co., 18 S. Clinton St., Chicago 6.

Double Simplex: Cast-iron pipe joints. American Cast Iron Pipe Co., Birmingham 2, Ala.

Doubleton: Axially and radically balanced multistage pumps. Allis-Chalmers Mfg. Co., Milwaukee 1.

Dover: Ohio first quality fireclay brick. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Dow No. 12: Brilliantly colored, hard protective coatings produced on magnesium by anodic electrolysis in lithium hydroxide, diethylene glycol solution. Need not be lacquered. Dow Chemical Co., Midland, Mich.

D.P.I.: Automatic controls and gages for high-vacuum production. Distillation Products, Inc., Rochester 13, N. Y.

Draco: Steel and tubular products. Drake Steel Supply Co., Los Angeles.

Draw Temp: Salt baths for tempering steel. Working ranges begin at 275°F, and all salts are recommended for a top limit of 1000°F. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

Drawalloy: Alloy welding electrodes used for facing and rebuilding forging dies and all types of drawing and forming dies. Welding Equipment & Supply Co., 223 Leib St., Detroit 7.

Drei-Brite: Descaling of wire, rods and strip, in multiple strands, continuous feed, recirculating sand, grit or shot, dustless. Dreisbach Engineering Corp., 83 Warburton Ave., Yonkers 2, N. Y.

Dresinate: Dry powders, which when added to alkaline-type material metal cleaners improve their cleaning effectiveness and rinse-off qualities. Hercules Powder Co., Paper-Makers Chem. Dept., Wilmington, Del.

Dresinate: Neutral salts of processed rosins; emulsifying agent, surface active and wetting agent, etc. Hercules Powder Co., Inc., Wilmington, Del.

Dresinol: Resin emulsions for water-dispersion, adhesives, etc. Hercules Powder Co., Inc., Wilmington, Del.

Dresser: Exhaust manifolds, mufflers, pipe couplings and fittings, rolled rings, hydraulic and upset forgings. Dresser Mfg. Div., Bradford, Pa.

Drever-Hardened Stainless Steel: Stainless steel, exposed at high temperature to "ironized" ammonia gas; high hardness (about 1000 Vickers Brinell) and wear resistance combined with good corrosion resistance; for high-pressure steam valve seats, oil-well pumps, plungers, power transmission roller chains, engine liners and valves, etc. Industrial Steel, Inc., 248 Bent St., Cambridge 41, Mass., and Drever Co., G & Venango Sts., Philadelphia 34.

• In order to assure the accuracy and completeness of this directory, manufacturers and suppliers serving the metalworking industry are requested to check the trade names appearing in this and succeeding issues and to advise THE IRON AGE of any omissions or errors. These changes will be incorporated in the first reprint made for general distribution. Communications should be addressed to THE IRON AGE, 100 E. 42nd St., New York 17. Attention Trade Name Directory.

Drew Sling: Flat braided wire rope sling. Macwhyte Co., 2911 14th Ave., Kenosha, Wis.

Drex-Kleen: Carbon tetrachloride for metal cleaning. Detrex Corp., Detroit 27.

Dri-Film: Water-repellent material. General Electric Co., Schenectady.

Dri Tex Waterproofing: For skid lumber and boxes to prevent moisture and wood acids from rusting steel sheets and coils and parts during shipment and export. Wayne Chemical Products Co., Detroit 17.

Driox: Liquid oxygen and nitrogen, delivered in tank-car or tank-truck lots, and stored by customer as liquid, and converted to dry medium-pressure gas as needed. Linde Air Products Co., 30 E. 42nd St., New York 17.

Driv-Lok Pins: Self-locking pins, made in sizes from 1/16 to ½ in. diam, 3/16 to 4½ in. long, in five distinct types and in various metals. Driv-Lok Pin Co., 565 W. Washington Blvd., Chicago 6.

Dry-Cyaniding: Case-hardening low-carbon carburizing steels to any depth up to 0.025 in. in a vapor. Perfection Tool & Metal Heat Treating Co., 1740 W. Hubbard St., Chicago 22.

Drymat: Unit dust collectors for grinding and buffing machines. Dallow, Lambert & Co., Ltd., Spalding St., Leicester, England.

Drytex: Unit dust collectors for grinding and buffing machines. Dallow, Lambert & Co., Ltd., Spalding St., Leicester, England.

DSM: Industrial and core-baking ovens. Detroit Sheet Metal Works, 1304 Oakman Blvd., Detroit 6.

D-10: Brass graphite oilless bearing made by powder metallurgy. Keystone Carbon Co., Saint Marys, Pa.

D.U.: Alloy cast steel rolls. United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh 22.

Duacone: Dies for automatic screw machines, semiautomatics, turret lathes, drill presses, etc. Pratt & Whitney, West Hartford 1, Conn.

Dual-Case: Heavy harness-leather case for carrying electrodes and weld cleaning tools. Atlas Welding Accessories Co., 14824 Wyoming Ave., Detroit 21.

Dualine: High-pressure centralized systems of lubrication to deliver oil or grease to a large number of bearings from one central station in exact measured amounts. Farval Corp., 3249 E. 80th St., Cleveland 4.

Dual Power Dial Type: Large knee and column type milling machines for heavy work. Cincinnati Milling Machine Co., Marburg Ave., Cincinnati.

Dual-Tool: Heavy-duty two-purpose tool for removing slag from welds by means of chisel or cone chipping head or wire bristle brush. Atlas Welding Accessories Co., 14824 Wyoming Ave., Detroit 21.

Dublchek: Cover for valve caps. A. Schrader's Son Div., Scovill Mfg. Co., Inc., 470 Vanderbilt Ave., Brooklyn 17.

Dubltite: Cover for rubber valves. A Schrader's Son Div., Scovil Mfg. Co., Inc., 470 Vanderbilt Ave., Brooklyn 17.

Duclean: Sulfuric or muriatic acids with inhibitors, used in pickling of iron and steel. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Ducol Steel: Plain-carbon steel for machinery parts. Colvilles, Ltd., Glasgow, Scotland.

Ductillite: Tin plate. Wheeling Steel Corp., Wheeling, W. Va.

Dukane: Plain-carbon steel for small tools and parts, drill rods. Pittsburgh Tool Steel Wire Co., Pauley St., Monaca, Pa.

Du-Lite: Black oxide finish for steel products. Du-Lite Chemical Corp., Middletown, Conn.

Dulkote: Dull-surfaced, non-spangled galvanized sheet specially prepared for immediate painting. Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh 30.

Dull: Sand and gravel washeries, excavators, conical washing screens, automatic sand separators. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Dullray: 34 Ni iron alloy with 4 Cr for electrical resistances. Henry Wiggin & Co., Ltd., Birmingham, England.

Dumet: Copper plated 54-46 Fe-Ni resistance alloy for sealing leads in electric light bulbs and radio tubes. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France; R. Y. Ferner Co., 131 State St., Boston.

Dunelt: Special alloy hollow steel bars. Dunford & Elliott, Ltd., Sheffield 9, England.

Duo-Flex: Refractory mortar. Laclede-Christy Clay Products Co., Ambassador Bldg., St. Louis 1.

Duo-Spiral: High-speed spiral cut chucking reamers. Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago 10.

Duo-Square: All-purpose clamps for holding parts in alinement while welding, filing, etc. McFerron-Myers Products Co., 308 Euclid Ave., Cleveland 14.

Duozinc: Zn and Hg alloy used for anodes in zinc plating processes. E. I. duPont de Nemours & Co., Wilmington, Del.

Duozinc: Zinc-mercury alloy furnished in bar form only for zinc plating. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

Duplex Gear: Series of nickel-chrome steels for gears, shafts, axles, crankshafts. Crucible Steel Co. of America, Chrysler Bldg., New York.

Duplex: Series of Ni-Cr alloy steels for carburized parts, cam shafts, gears, pinions. Crucible Steel Co. of America, Chrysler Bldg., New York.

Duplex: Heavy, power-driven pipe threading and cutting machines. Bignall & Keeler Machine Works, Edwardsville, Ill.

Duplex: Specially designed locomotive reamers with alternating spiral flutes. Chicago-Latrobe Twist Drill Works, 411 W. Ontario St., Chicago 10.

Duplex Tubing: Tubing with an interior of nonferrous metal and exterior of ferrous metal. Bridgeport Brass Co., Bridgeport 2, Conn.

Duplicating Attachment: For use on engine or turret lathes for the automatic precision turning of irregular shaped parts such as step shafts, dies, forming rolls and bottle molds. Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10.

DuPont Carburizing Salt: Cyanide mixture, granular or pellets, used for case hardening steel. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

DuPont Case Hardener: Mixture of sodium cyanide, chloride and carbonate for case hardening of steel. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

DuPont Heat Treating Salt No. 1: White, crystalline, nitrate-nitrite mixture, used in tempering of steel, heat coloring of steel and as a heat transfer medium. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

DuPont Heat Treating Salt No. 3: White, crystalline, chloride-carbonate mixture, used in hardening of steel; annealing of low-carbon steel wire and nonferrous metals such as silver and nickel; as a cover for lead baths used for hardening steel. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

Dupont Metal: 3 Si, 1 Mn copper alloy for bolts, screws and airplane parts. DuPont Everdur Co., Wilmington, Del.

DuPont Sodium Hydride Descaling Process: Bath developed for the quick and positive removal of oxide scale from alloy steels, particularly the stainless steels, nickel, cobalt, copper and all metals, alloys and bimetallics or composites which are not affected by fused caustic soda at 700°F. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

DuPont Zinc Ball Anodes: Anodes in electroplating baths to supply zinc metal for alkaline or acid zinc solutions. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

Dupor: Respirators and rubber goggles. H. S. Cover, Station A, South Bend, Ind.

Duquesne Special: Cr-Mo alloy castings for rolls in severe service. Continental Roll & Steel Foundry Co., E. Chicago, Ind.

Durabilt: Suspended furnace arches and replacement tile; sectionally-supported walls; automatic ash disposal systems. Chicago Fire Brick Co., 1467 Elston Ave., Chicago 22.

Durable Wire Rope: Composite wire and fiber rope in which the individual steel wire strands are wrapped with marline for increased ease of handling and flexibility. John A. Roebling's Sons Co., Trenton 2, N. J.

Duracast: See West.

Durachrome: Si-Cr-Mo alloy cast iron for valve seat inserts. Thompson Products, Inc., 2196 Clarkwood St., Cleveland.

Duracid: Cast iron with 16 Si for chemical apparatus. Maschinenbau, A.G., Golzern-Grimma, Germany.

Durad: Luminous paint; glows in the dark without the use of radioactive substances. Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N. J.

Duraflex: Rubber-lined electroplating tanks. Rubber Lining Engineers, 2700 W. 35th St., Chicago 32.

Dural: Aluminum alloy with 5 Cu and Mn-Mg-Fe-Si-Cr; for light-alloy parts, aircraft structures. Aluminum Co. of America, Gulf Bldg., Pittsburgh.

Duralite: High aluminum firebrick for use in extremely high temperatures. Chicago Fire Brick Co., 1467 Elston Ave., Chicago 22.

Duralite Goggle: Individual eyecup goggle for protection against foreign particles striking from any direction. Super Armorplate lenses—clear or calobar. American Optical Co., Southbridge, Mass.

Duraloy: Heat resisting high nickel-chrome steels for furnace parts. Duraloy Co., Scottdale, Pa.

Duralplat: Highly corrosion-resistant duralumin coated with aluminum for light-alloy parts. Durener Metallwerke, Duren, Germany.

Duralumin: Alloy with Cu-Mg-Mn-Fe-Si for airplane and dirigible construction. Aluminum Co. of America, Gulf Bldg., Pittsburgh 19.

Duramask: Protective liquid coating for paint-room floors. Turco Products, Inc., Los Angeles 54.

Duranalium: Corrosion-resistant Mg-Mn bearing aluminum alloy for rivets, bolts, screws. Durener Metallwerke, Duren, Germany.

Duranites: Fast-baking finishes for metal and plastic products. Zapon Div., Atlas Powder Co., Stamford, Conn.

Duraspun: Centrifugally-cast alloy steel. Duraloy Co., Scottdale, Pa.

Duraweld Goggle: Individual eyecup welding goggle. Indirect ventilated side shields to keep out stray light rays and sparks. Noviweld or Noviweld-Didymium lenses. American Optical Co., Southbridge, Mass.

Durawood: Wood and plastic combinations. Westinghouse Electric Corp., East Pittsburgh, Pa.

Durco: Series of chrome-nickel stainless steels for chemical plant, food handling, and paper mill equipment. Duriron Co., Inc., Caxton Bldg., Dayton.

Durco D-10: Nonferrous alloy containing 80 pct Ni and chromium, balance being molybdenum, tungsten, copper, manganese, silicon, etc.; for special corrosive applications. Duriron Co. Inc., Dayton 1.

Durco 18-8S: Low-carbon austenitic stainless steel, 18 Cr 8 Ni, 0.07 max. C. Duriron Co. Inc., Dayton 1.

Durco 18-8SMo: Low-carbon austenitic stainless steel, 18 Cr, 8 Ni, 3 Mo, 0.07 max. C. Duriron Co. Inc., Dayton 1.

Durehete: Creep-resisting alloy steel with Cr-Mo; for high-temperature use, turbine valves, bolts, pipe flanges. Samuel Fox & Co., Ltd., Sheffield, England.

Durexalo: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

Durex Iron: 98 Fe, 2 C; porous material pressed from iron powder; is self-lubricating, hard, strong, stable and wear-resistant; for bearings, machine parts, cams, gears, etc. Moraine Products Div., General Motors Corp., 1421 Wisconsin Blvd., Dayton.

Durexite: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

Durexsil: Silicon-carbide abrasive. Clover Mfg. Co., Norwalk, Conn.

Durez 77S: Phenol formaldehyde plastic with low water absorption and extra-smooth finish; acid, alkali and wear resistance. Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.

Durez 775: Phenolic molding compound; general purpose with excellent molding characteristics and a fast cure. Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.

Durez 1900 and 1905: Phenol formaldehyde plastic with high impact strength; for heavy duty moldings. Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.

Durez 1910: Phenol formaldehyde plastic containing graphite; good strength, relatively high conductivity, excellent friction properties; for bumper shoes, lock bolts, etc. Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.

Durez 7347A: Phenolic resin, applicable to porous castings: impregnation under air pressure followed by baking with or without steam pressure. Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.

Durez 8685: Molding compound with high resistance to carbonization under an electric arc. Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.

Durez Nos. 11540, 11863 and 11934: Phenol formaldehyde plastics. Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.

Durface: Iron-base hard-facing alloy; high hardness, excellent wear resistance and corrosion resistance. Eutectic Welding Alloys Co., 46 Worth St., New York 13.

Durface: Welding rod. American Brake Shoe Co., 230 Park Ave., New York 17.

Durhy: Dense, refractory, highly siliconized silicon-carbide material; can be produced in intricate shapes and assemblies; extremely

(CONTINUED ON PAGE 139)

New Equipment . . .

Material Handling

Recent developments in hand lift and fork type industrial trucks, electric hoists, crane controls, conveyors, rotary and telescopic tables, platforms and pallets, hoppers and other miscellaneous units for material handling are described in the following pages.

FEATURING electric lift and foot lift, new models of the Transporter motorized hand truck manufactured by *Automatic Transportation Co.*, 149 W. 87th St., Chicago 20, have been announced. The Transporter with electric lift, illustrated, is a 6000-lb load capacity platform unit, which can operate with a standard 11-plate battery. An electric lift pump and motor

have been developed which use less current than the reserve left in the foot-lift Transporter's standard 11-plate battery, at the end of the full working day, it is said. Interchangeability of batteries and battery chargers throughout Automatic's line of motorized hand truck units is possible. All controls, forward and reverse, speed, lift, steering and brake, are so arranged that they may be regulated by one hand and operated virtually simultaneously. No lift and move, even with maximum load and to maximum height, requires as much as 5 sec, it is claimed. Feature of both the electric lift and foot lift Transporters is a double-action brake, which is applied either by raising or lowering the guide handle. Three standard units, 4000 and 6000 lb load capacity platform models and a 4000 lb capacity pallet model, are available.

Fork-Type Truck

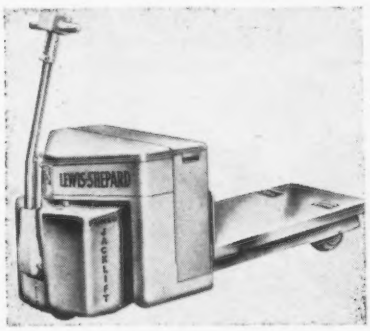
IDENTIFIED as Model F24T and having an elevating reach of 18 ft above floor level, a fork-type power industrial truck has been announced by *Elwell-Parker Electric Co.*, 4205 St. Clair Ave., Cleveland 14. New features of design and construction make the truck useful for high-tiering materials and merchandise. It is compact, with increased speed and flexibility for maneuvering, and lifting and lowering loads. The new truck which picks up loads on its bare fork or on pallets in the same manner as with standard models, has a capacity rating at 4000 lb for lifting to a height of 11 ft, and 3000 lb to 18 ft. It is electrically driven, with three separate motors; one for traveling, one for operating the elevating mechanism, and the third for tilting the upright columns. Tilting limit is 15° backward and 5° forward from vertical. Lifting speed with capacity load is 13 fpm, lowering speed 20 fpm; truck's traveling speed 5 miles per hr. Body of the truck, independent of the uprights and fork, is 7 ft 8 in. long, overall width, 3 ft 2 in. The truck is end-controlled.

Fork Truck

CALLED the Sky Lift and combining high-pressure hydraulics and full automotive-type controls, a telescopic, tilting, hydraulic lift electric fork truck has been announced by *Automatic Transportation Co.*, 149 W. 87th St., Chicago 20. Featuring a lift of 103 in. on a fork truck of standard 83-in. collapsed height and at the same time capable of tiering to ceiling heights in boxcars and low-clearance buildings, the Sky Lift is designed to operate like an automobile. It has a pneumatic controller which operates as the electric counterpart of an automobile gearshift. Controls include two foot pedals, steering wheel and two levers, also closely paralleling automobile controls. Brake pedal and foot accelerator are both identical to those of a car. The two levers, controlling tilt and lift and forward-reverse direction, are just below the steering wheel. Other features include silicone varnish insulation of the electrical system, disk-type traction brake, special flow control valves in the hydraulic system, and full "dead man" control.

Hand Lift Truck

VERTICAL handle operation and an electric brake are featured in the power Jacklift, built in both platform and pallet models by the *Lewis-Shepard Products, Inc.*, 248 Walnut St., Watertown 72, Mass. It is an electrically operated hand lift truck with electric button operation, located in the handle head. Every operation can be performed with the handle vertical. Release the handle and the electric brake is said to instantaneously stop the truck in its tracks. In the vertical position or when lowered, the handle has a steering arc of 200°. Both models are driven by an electric master drive unit. Trucks are available in several lengths, the platform truck made in both wide and narrow models.



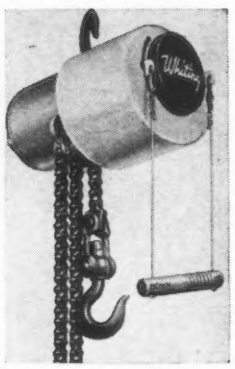
Hydraulic Power Unit

FOR stacking and tiering where speed of elevation is important, *Lyon-Raymond Corp.*, 2915 Madi-

son St., Greene, N. Y., has produced a hydraulic power unit for their hydraulic high-lift trucks. The power unit is compact and self-contained, consisting of electric motor, hydraulic gear type pump, valves, oil reservoir and necessary controls. It is available with either a ½ or ¾-hp motor. Twenty-five feet of conductor cable complete with plug is standard equipment and self-winding cable reels are available as an optional extra. Danger of overloading is eliminated by a relief valve in the hydraulic system.

Portable Electric Hoists

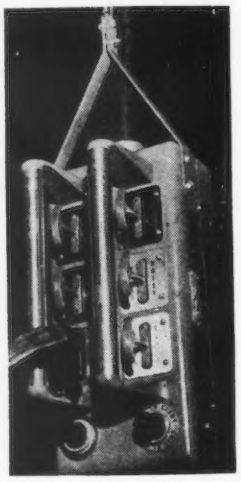
ROLLER-CHAIN electric hoists of ¼, ½ and 1-ton capacity have been announced by the *Whiting Corp.*, Harvey, Ill. The 1-ton hoist weighs 87 lb, light enough for one man to install or move it without assistance. The hoist utilizes a double-reduction, totally enclosed, worm-gear drive, which makes possible the hoist's compactness and light weight, and reduces the number of wearing parts. A self-energizing motor brake interlocks with the controller to provide safe operation. Upper and lower safety limit switches are provided. The load hook has a universal action and swivels on ball bearings, which prevents the roller chain from twist-



ing. Control is by means of a single bar grip, which can be operated by one hand. The hoist can be operated in an inverted position.

Crane Control System

DESIGNED for floor-operated cranes, a pendant pull station control has been announced by the Control Div., *General Electric Co.*, Schenectady 5. Furnished for use on ac or dc with motors up to 15 hp at 220 v the control system can be used on cranes ranging in size from simple hoists to three-motion bridges, providing them with the same smooth operation and control refinements as cab-operated cranes, it is reported. The control system consists of a small magnetic control panel mounted on the crane and connected by a cable to a pendant station which is suspended from



the crane. It provides five-point, time-delay speed control for smooth, fast control of the crane movements. The pendant station has one handle for each direction of crane motion. As the handle is pulled out the crane motor accelerates to the speed indicated by the position of the handle in the operator's fingers. All crane motions can be controlled with one hand. Protective features include an emergency stop button which instantly cuts off the power from all crane motors. The pendant pull station which weighs 8½ lb may be suspended from the trolley of the crane to hang beside the load, or hung at a distance.

Clamp Trucks

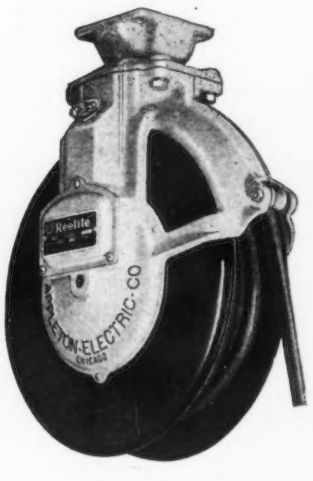
ONE-man clamp trucks for in-plant moving of materials are being produced by *Food Machinery Corp.*, Riverside, Calif. At the base of the trucks are short, powerfully-tipped arms that squeeze with such strength they can lift a loaded box or boxes weighing from 300 to 600 lb. The squeeze is applied by stepping on a pedal. Being able to maneuver in and out of small areas the clamptrucks can supplement work of power-lift trucks, in helping to speed in-plant movement of material. Other features of the five models include a front shield to permit handling of heavily loaded boxes without spilling the contents, and tilting frame, which permits the carrying of a stack of boxes or provides extra leverage on heavy lifting.

Hand Truck

BUILT to handle the heaviest loads practical for manual trucking, a general service hand truck has been announced by the *Thermoid Co.*, Trenton 6, N. J. This truck, 53 in. high x 18 in. wide with 9-in. wheels is made of aluminum alloy castings with a steel nose. Its light weight is accomplished at no sacrifice of wear-resisting strength, it is reported. Ease of operation results from lightweight structural materials, perfect balance, a long 7-in. nose that makes breaking a load easier, and solid rubber tired ball bearing wheels. The solid tire is cut resistant. A line of 6, 8, 9, 10, and 12-in. aluminum wheels for general industrial application is also available from the company.

Cable Reels

TYPE YS Reelite has been designed by *Appleton Electric Co.*, 1701-59 Wellington Ave., Chicago 13, especially for use with traveling hoists. This reel automatically takes up and pays out



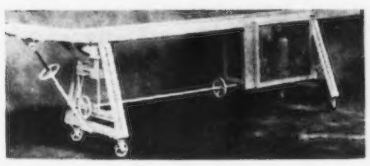
conductor cable on exposed current collectors, trolleys or wires. It serves any stretch of track, straight or with one or more bends, up to double its cable length. For curved track and certain straight back installations, the Reelite is furnished with swivel base, permitting rotation up to 335°. Conductor cord is kept taut at all times, enabling the spring controlled reel to take up and pay out cable in harmony with movements of the hoist. Reelites can be installed with electric hoists having traveling distances up to 90 ft.

Hinged Conveyor Line

FOR use in a permanent line of standard Rapid-Wheel gravity conveyor, a hinged section has been produced by the *Rapid-Standard Co., Inc.*, Dept. HS-67, 308 Peoples National Bank Bldg., Grand Rapids 2, Mich., to bridge an aisle-way for passage of personnel, trucks or equipment by providing 36 in. maximum open passage-way through the conveyor line. The hinged section is opened by lifting the movable part up and back until it rests securely on the stationary section. It consists of 36 in. of movable section hinged to an 84-in. long stationary section, totaling in all 10 ft. The hinge is of simple design and of all steel, rugged construction.

Extruded Parts Conveyor

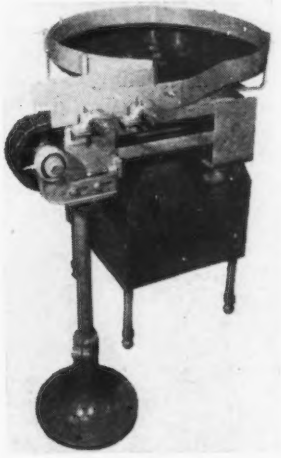
FOR conveying plastic and rubber material from extruders, the *Island Equipment Corp.*, 101 Park Ave., New York 17, has announced a Unitable. The table has three control hand wheels, one for adjusting the height of the 2-ft long infeed section which fits closely to the outlet of the extruder and which has an adjustable up and down movement of 6 in. from center. The other two wheels, operating on the shaft under the belt, provide control for the travel speed of the belt. The machine is equipped with large easy rolling casters,



a special belt to withstand the heat of the parts from the extruder. Variable speed units from 300 rpm max to 0 rpm min can be supplied. The belt speed must be timed with the rate of extrusion.

Rotary Accumulating Tables

TO provide a reserve reservoir which temporarily takes care of the excess material on a conveyor when the feed of the conveyor is greater than the operating equipment or personnel capabilities, the *Island Equipment Corp.*, 101 Park Ave., New York 17, has marketed a rotary accumulating table. The unit has a square base and round, flat steel top on which revolves a disk where materials being conveyed, rest. This disk is automatically motor driven at any desired speed to synchronize with the speed of the conveyor. The company has also



announced a rotary unscrambling table which permits a carton or case of items to be placed on the revolving table, the carton or case lifted off, leaving the contents on the table. Each individual item is then automatically sent on its way in an orderly, constant procession; no manual effort or attention is required.

Ball-Bearing Turntables

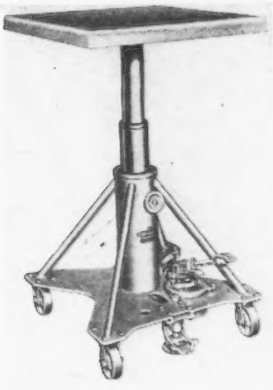
INTRODUCTION of a rugged, simple turntable for turning loads to any position, almost without effort, has been made by the *Whiting Corp.*, Harvey, Ill. The turntable top, which is plain, grooved, raised track or checkered, is carried on a ring of 1-in. diam ball bearings, running in a specially machined ball-race to permit wide distribution of load and easy operation. A quick-acting, foot-operated release lock, at table top level, holds the table securely in position. Standard sizes range from 42 to 96-in. diam.

Low-Cost Pallet

ADAPTED to fork-lift trucks are the X-P expendable pallets offered by *Techtmann Industries*, 714 W. Wisconsin Ave., Milwaukee 1. A reduction of 60 pct in weight is achieved in this four-way pallet, it is said, by the use of a double corrugated board top supported on square or round wood blocks. The entire top and block ends are dipped in a water-resistant adhesive which seals off moisture from the load. It is claimed 4000-lb loads have been carried on the X-P pallet without failure, and tests show that this pallet will survive a number of trips without appreciable damage under normal conditions of shipment by rail or truck. However, the cost of the expendable pallets is so low they can be discarded after a single trip. Maximum load stowage is attained in the standard 42 x 48-in. size.

Telescopic Table

DEVELOPMENT of a telescopic cylinder for their hydraulic elevating table, which makes possible an elevating range from 28 to 50 in. or a total lift of 22 in., has been announced by the *Lyon-Raymond Corp.*, 2808 Madison St., Greene, N. Y. The strength and rigidity of the central column has not been lessened. In the handling of dies, jigs and fixtures, the telescopic table permits leveling with press beds and storage racks allowing for easy transfer. The



greater range of elevation is also valuable when the table is used in assembly. Except for cylinder and guide sleeves, standard elevating table parts are used.

Platforms and Pallets

WEIGHT reductions, said to average 40 pct with correspondingly greater payloads, and cost and shipping economies, are featured in a line of standardized material handling equipment announced by the *Monroe Auto Equipment Co.*, Monroe, Mich. Manufactured of high tensile steel, the line consists of six products offered in various standardized sizes to include a total of 14 units of platforms, nestling rings, boxes, skids and pallets. Basic platform skids, available with or without runners, are designed for storage of boxes, flat material, etc. Six-inch, center-to-center corrugations

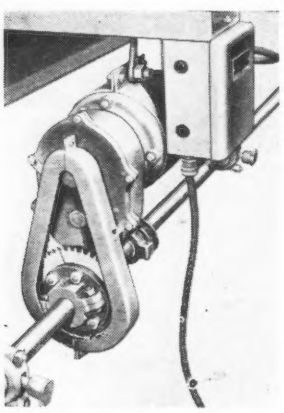
give added strength. They come in two sizes, 33 x 54 x 12 in. and 42 x 60 x 12 in. Nestling rings for converting platform skids to boxes, have corner boots which fit over skid corners. Tiering lugs may be added for stacking. Platform boxes consist of the basic platform skid welded to nestling ring and are available in three sizes. Other units are wood and steel platform skids and pallets, and all steel pallets.

Car Door Opener

ONE man can open or close the most obstinate freight car door, it is said, with the 1947 model of the Monarch one man car door opener, announced by the *Mining Safety Devices Co.*, Bowerston, Ohio. It is said to withstand the roughest daily handling. The steel case has been redesigned to enclose the locking pawl and eliminates any interference with corrugated doors. Case and pawl are of high strength alloy steel. The welded steel chain is treated with a galvanized finish.

Electric Power Travel

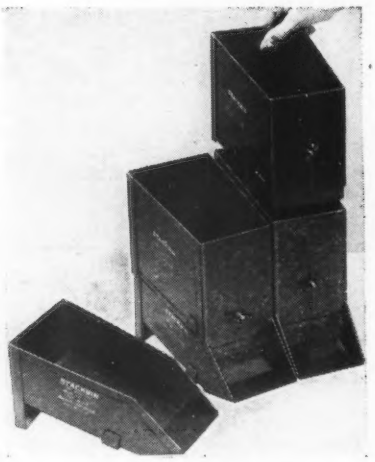
UNIVERSAL type mounting has made the Travelator applicable to any type overhead crane, both single and double girder, the *Northern Engineering Works*, 2615



Atwater St., Detroit 7, has announced. Nearly every arrangement of beam and hoist to be found in hand-traveled cranes can be handled with this new universal mounting. The motor is held in a steel mounting band which is connected to the mounting bracket. This mounting band may be given any position about the periphery of the motor. As a result the motor may be given any desired position about the axis of the squaring shaft which it drives. The variety of positions thus made available, permits application to most types of hoist cranes.

Adjustable Hoppers

REGULATING the flow of small parts in assembly bins is possible by means of sliding-front hoppers announced by *Stackbin Corp.*, 124 Troy St., Providence. It



is said they will prevent overflows or jamming of parts. The adjustable hoppers not only provide increased capacity for parts but also provide regulated flow of parts according to sizes and weights as the opening can be made small or large. When two hoppers are used, one on top of the other, the increased weight of parts, which tends to force out too many units, can be offset by regulating the size of the opening. Hoppers are made of heavy gage sheet steel with welded construction throughout.

Hydraulic Jacks

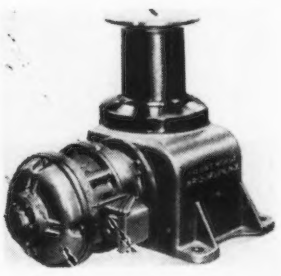
KNOWN as Liftmaster jacks, a line of hydraulic jacks, built of drop forged steel, has been announced by the *Joyce-Cridland Co.*, Dayton 3. This Nu-Hydro jack has pump piston of tool steel hardened and ground to mirror-like polish. Pump cup packing produces as near leak-proof construction as possible. Ram cap is steel forging and designed to give maximum load contact and safety against slippage. Minimum starting height is 9 or 10 in. with total height of various models ranging from 16 7/16 to 18½ in. Handle is interlocking type. Also announced is an axle stand built of angle iron with the rack bar, latch and yoke made of malleable iron with teeth on both sides of rack bar which assure the bar is safely engaged and will not slip under load. Low height is 15 in., extension 12 in. and extension height, 27 in. The latch is gravity controlled. A free wheeler jack which slides into position under car, bus or truck, has been designed by the company for under body jobs. It is built in five models, with three adjustable head caps to fit various types of axles, housings, side frames, etc.

Wire Rod Stock Grab

FEATURING counterbalance and the use of pipe for the lifting section, an improved wire rod and coil strip stock grab has been announced by *Mansaver Industries, Inc.*, 310 East St., New Haven 3. The latter feature reduces the bending effect on a strip or wire, it is said, while the counterbalancing makes it possible for any one to insert the grab without any appreciable effort. It is made in capacities of from 1000 to 6000 lb, in exact lengths to meet the customers' requirements.

Car Puller

ANNOUNCEMENT of an electric capstan car puller in which gearing is integral with motor, has been made by the *Silent Hoist Winch & Crane Co.*, 841 63rd St., Brooklyn. The device is compact, totally enclosed, making the unit dirtproof, waterproof, and suitable for out-of-door use. The



enclosed worm-gear reduction runs in a continual bath of oil. The car puller is available in two sizes, a 7½-hp unit with capacity of 5000-lb draw-bar pull and a 15-hp unit with 10,000-lb draw-pulling capacity, all completely assembled. Units are available for 220/440 v, 3 phase, 60 cycles, and for dc service on application. Car pullers can be furnished with control and other accessories such as rope, car hooks, snatch blocks, etc.

YOU NEED TO REDUCE THE WEIGHT OF YOUR SETTINGS

FUEL COST PER TON MELTED COULD STAND TRIMMING

POT LIFE SUFFERS FROM HOT SPOTS AND OVERHEATING

put KEMP on your "problem jobs" in tin, lead and salt melting

For example: those who alloy and refine the soft metals want lighter pots for easier tilting and cleaning between melts. KEMP immersion elements can be hoisted out at any time, leaving the pot clear—and all you have to tip is the pot itself, not a ton of brickwork.

For example: any tinplate mill can follow the cue of one of the largest in the East, and cut 40% off its gas bill by switching its stacks from side-firing (through the pot) to KEMP immersion-firing (inside the pot).

For example: heat treaters can minimize chemical attack by molten salt at the liquid line through KEMP pots with stainless steel bands welded in at that point.

And so it goes! The coupon below will put KEMP on the trail of your soft-metal or salt melting problems.

REMEMBER THESE VIRTUES OF KEMP IMMERSION FIRING

1. The pot is heated only by the molten materials. Therefore, the temperature gradient across the pot wall is *down* (not *up*) from the bath temperature.
2. No refractory structures are needed to form a combustion chamber. Light mineral wool insulation around the pot is all that's needed.
3. Spent combustion products are vented down over the bath. They blanket the surface to exclude air (reducing dross) and lower heat losses from the molten surface.

TYPICAL LEAD OR STEREOTYPE POT

PRECISION CARBURETION + ADAPTED COMBUSTION
FOR INDUSTRY'S HEAT-USING PROCESSES
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NAME.....

POSITION.....

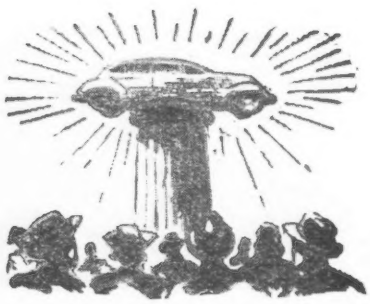
COMPANY.....

PLACE.....

Assembly Line . . .

WALTER G. PATTON

• Good possibilities for a 5 million car year in 1947 are seen . . . Million car backlog reported by Chevrolet . . . Shortages of many items destined to continue.



DETROIT—The chances that the automobile industry will build and sell 5 million cars and trucks in 1947 are probably better than is generally supposed. At least one spokesman for the industry has come to this conclusion after a searching examination for ALL the factors that are likely to influence automobile output during the coming 12 months.

Despite portal pay suits aggregating many millions of dollars, the present high price of cars and trucks and the continuing threat of labor strife, this sales executive is convinced the automobile industry can market 5 million cars and trucks in 1947 and will do so if it gets "half a break so far as strikes and plant shutdowns brought about by strikes are concerned."

According to this spokesman, if the industry gets through March without a sizable work stoppage in the automobile or steel industries, the chances for a 5 million car year will be very good indeed.

To sustain this view, he points out that the long range market for new cars hasn't even been scratched. For example, the estimated number of passenger cars in operation in December 1946 was only 27,088,000 compared with 29,500,000 in 1941. Meanwhile, he argues, the number of trucks in use in this country has jumped from 4,859,000 in 1941 to 5,423,000 in 1946. A similar trend has been noted in telephones which show 31,670,000 instruments in service at the end of 1946, an increase of 82 pct over the 1935 total. Why, he asks, will not passenger car registrations show a similar upward trend in a free economy?

The usual argument that the price of cars is too high is met by the counter argument that despite today's high prices for cars, it is still possible in most cities to drive a new car around the corner and sell it as a second hand car for $200 or more than the new car price. This is evidence, it is argued, that there is still plenty of value in motor cars even at today's high prices. Another example of the firmness of the present demand for automobiles, he says, is furnished by the fact that after 9 months' production, Chevrolet still has orders on its books for more than a million cars and trucks.

ACCORDING to T. H. Keating, general sales manager, "This order bank has risen steadily since 1946 production began last April. At that time, unfilled orders totaled well over 800,000. With production finally under way, by the end of June orders had passed the million mark and, despite the fact that production has mounted steadily and more and more units have been placed in the hands of waiting customers, orders in the last half of the year climbed at a steady rate of approximately 10,000 per month.

"The order backlog is sufficient to carry through 12½ months on passenger cars and 15½ months on trucks, producing at the present rate," Mr. Keating added.

Despite recurring reports of duplicate orders and customer cancellations, this sales authority insists that there is yet a firmness in automobile demand that should effectively cushion the effect of a flash recession which so many economists are today predicting.

According to this marketing executive, the present softness of commodity prices should be a favorable factor so far as the automobile industry is concerned. With prices of textiles, foods and certain household items such as radios and certain appliances already on the down grade, he reasons that some of this potential purchasing power will become available for the purchase of a new car.

Barring major strikes, it is felt that the automobile materials situation is almost certain to ease during the coming months. While it is acknowledged that lead, copper and zinc may be exceptions, decontrol is bound to be followed by realignment of prices that will bring out items to plug the gaps where shortages may now exist. Eventually, it is argued, this will serve to intensify competition which may even before 1947 is history serve to reduce prices for many items.

ANOTHER factor tending to keep automobile production at a high level is today's mountainous inventories in automobile plants. All producers, this analyst argues, are anxious to reduce their inventory investments as rapidly as possible and they will tend to avoid in 1947, if at all possible, any buying policy that will increase inventory investments. This policy, he believes, will help to insure better distribution of materials and parts during 1947.

It is agreed that shortages in many lines—including lead, lumber, leather, natural rubber, cadmium, antimony to mention a few items—will continue for several months. It should be noted, however, that the industry has learned a great deal during the war about conserving many of these materials and this experience will be used to advantage in 1947 to keep production lines rolling.

The industry's manpower situation is also improving, according to recent reports. Job seekers are more ready to settle down. Occasional layoffs in plants have served to emphasize the value of having a job and worker productivity has improved. Thousands of green workers who came to the auto industry shortly after VJ-

BULLARD 64" AND 74" CUT MASTERS.....

Combine Power, Accuracy and Speed

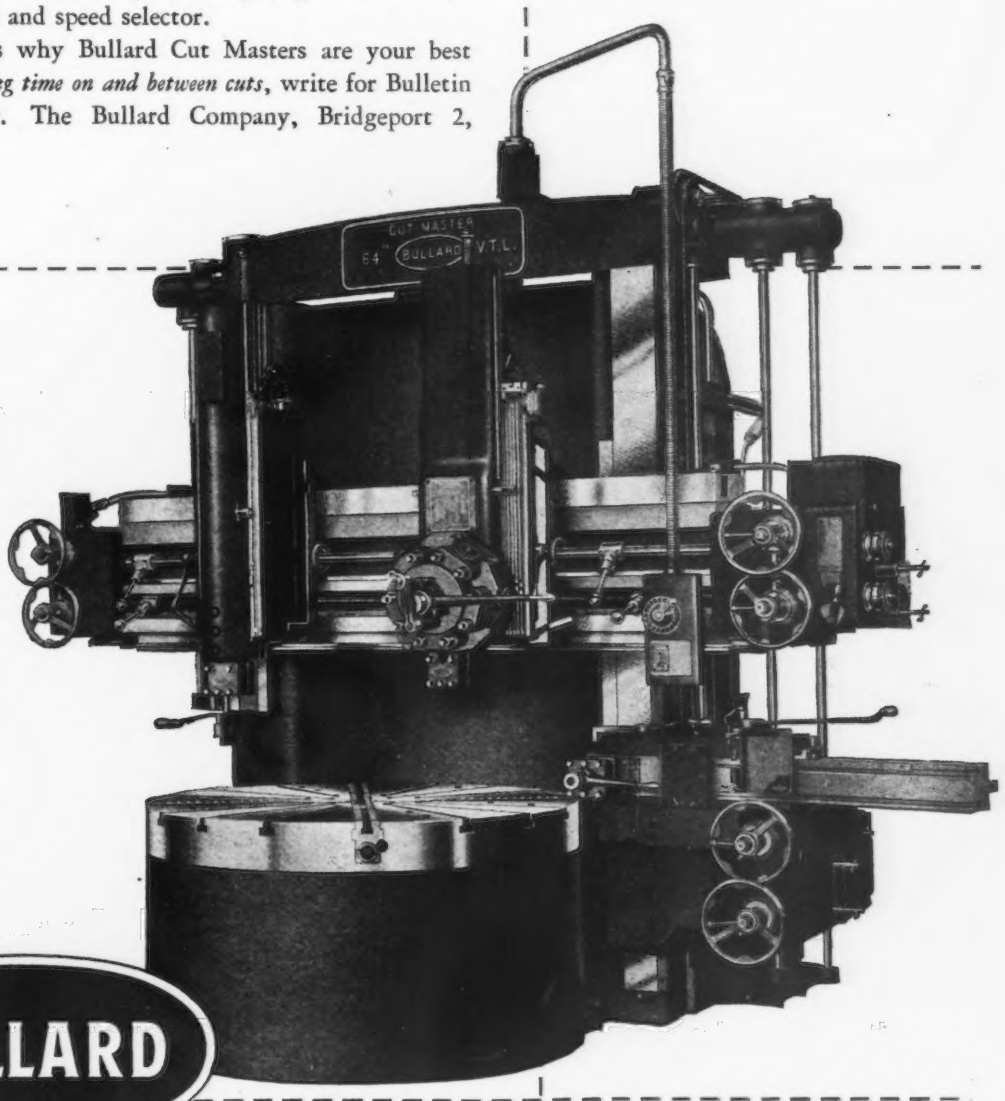
It has always been Bullard's policy to *create methods for cutting production time* instead of just building machines. That's why you'll find so many features of a volume-producing small machine in these massive, solidly constructed, highly accurate 64" and 74" Bullard Cut Master Vertical Turret Lathes.

There's extra speed in the smooth flow of power and the wide range of speeds and feeds that let you take advantage of the heaviest possible cuts with the newest carbide tools.

There are extra advantages in the hydraulically controlled limit switches which assure consistent duplication of dimensions, and speed up operations.

There is saving in operating time with the Bullard exclusive (patented) Pendant Control providing for clutch and brake, and instantaneous change in speeds by the simple operation of two-position finger lever and speed selector.

For other reasons why Bullard Cut Masters are your best investment for *cutting time on and between cuts*, write for Bulletin CVTL-4-1-46 today. The Bullard Company, Bridgeport 2, Connecticut.



Like the smaller 30", 36", 42" and 54" Cut Master Vertical Turret Lathes, these larger machines have the versatility that comes from 16 feeds for each head and 20 table speeds. The 64" size is made with a one-piece bed . . the 74" in four massive pieces . . . for the vibration-free rigidity that assures maintained accuracy.

BULLARD

CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

Day, it is reported, have now been trained. It is confidently expected that the hundreds of training programs instituted by the motor industry since VJ-Day will begin to pay real dividends during 1947.

There are even hopeful signs in the field of labor relations. According to this observer, late spring may be the quietest period in the labor field since VJ-Day. This will be the case, he argues, if it then looks like the Russians will be in a position to capitalize on continuing labor strife in this country or a falling off in business volume in this country.

It is also possible that the solving of many managerial problems and the easing of materials problems will help to boost worker productivity in 1947.

AS is well known, the facilities are available for automobile production at considerably higher than a 5 million car rate. In many plants, new machines and welding equipment have been installed that will permit production at unprecedented rates when the materials and labor are available.

A further point in favor of high potential motor car production in 1947 is the fact that the automobile industry is less dependent on hand labor today than at any time in its history. High wages have made mandatory the elimination of hand operations wherever possible and this trend is already well established. Thus, the expensive hand labor bottleneck in many auto plants is being eliminated as rapidly as possible.

Other favorable factors include the return of most auto plants to tested peacetime specifications, simplified product design and better-trained supervision. Whatever may be the decision of the Supreme Court in the foremen's case, it is argued, the fact that the case will soon be decided can help to clear up a badly confused supervisory condition.

Additional favorable evidence may be found in the fact that installment buying restrictions are now removed, and that shoddy goods which have been absorbing a substantial amount of consumer buying power are rapidly being driven from the market. Not to be overlooked is the fact that the estimated farm income for 1946 is $15 billion which is more than three times as great as the 1939 figure. The farm demand alone for cars would be able to sustain automobile production at a fairly high level, it is maintained.

While it is not necessary to agree with all the arguments that can be advanced to justify a prediction that the automobile industry will have a good year in 1947, it is at least helpful to get away from the overwhelming attention being given today to portal suits, high prices for cars and threats of strikes and depression.

NO PUSHOVER: *A lone mechanic easily holds a 1947 Studebaker Champion at its center of balance in a striking demonstration of stability. The angle of tilt here is more than two-thirds off horizontal, indicating strong resistance to tipping.*

Automotive Sales Top 2.7 Million in 11 Months

Detroit

• • • **Factory sales** of passenger cars for the first 11 months of 1946 totalled 1,882,012, and 831,409 trucks were sold during the same period, bringing the total car and truck sales in 1946 to 2,713,421 vehicles, according to the Automobile Manufacturers Assn.

Passenger car sales through November amounted to 53 pct of the sales for the same period of 1941, while truck and bus sales were 84 pct of the accumulated total for the same period of 1941, according to a statement by George Romney, managing director of AMA.

The agency said that the industrywide total of passenger cars, motor trucks and buses for the 11 month period of 1946 was 60 pct of the total for the same period of 1941. It also pointed out that sales figures for the month of November failed to indicate the true picture when compared with the same month of 1941, since cutbacks arising from the war effort were in effect during late 1941.

Factory sales of passenger cars for November, 1946, aggregated 269,081. During the same period 100,892 motor trucks and 1146 motor coaches were delivered from factories.

Reports Machine Tools Equal Half of Surplus

Washington

• • • **Excluding industrial** real property, more than half the surplus property currently on sale throughout the nation is represented by machine tools, it is revealed by year-end figures released by the War Assets Administration.

Up for sale are machine tools having an original cost value of $544 million; total surplus, other than real property, on sale at the beginning of 1947 has an original cost of $999.7 million.

Largest machine tool offerings, from point of original cost, were listed with the Detroit regional office which had for sale some $192 million worth, representing 70 pct of its total surplus offerings.

Cincinnati ranked second in value of offerings with about $189 million worth of tools.

OUTSTANDING PERFORMANCE IN SERVICE!

THE MACHINE—*Lewis Wire Straightening and Cutting Machine*

THE CASTINGS—MEEHANITE

Close-up of MEEHANITE revolving arbor and straightening blocks

Traveling cut-off Head cast in MEEHANITE

The latest development in wire straightening and cutting equipment is being manufactured by The Lewis Machine Company, Cleveland, Ohio. A major application of this equipment is the production of welding rods perfectly straight to exact lengths at high speed.

The straightening arbor illustrated is a Meehanite Casting in which slots are cored to receive the Meehanite straightening blocks. In service wire is drawn through the revolving arbor which straightens the wire by pressure applied by the straightening blocks.

After considerable experimentation no other material provided the economic service life and produced wire free from scratches as well as Type GA Meehanite straightening blocks, hardened by quenching from 1600°F. and drawing at 350°F.

Other Meehanite Castings in the machine include a flywheel with integral bevel gear, traveling cut-off head, various arms and levers.

All parts described require high strength, wear resistance, dense, uniform castings—high quality.

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Washington . . .

L. W. MOFFETT

• Reserves from profits stabilized postwar payrolls . . . Analyses by MAPI and NAM economists discount Nathan report as economic weapon.

WASHINGTON — Centuries past, so the story goes, a man named Joseph went forth throughout the land of Egypt for the purpose of acquiring excess grain during the years of better than normal production; the supplies thus accumulated and held in reserve served to tide the country and its populace over the ensuing years of drought and famine.

Such lessons as may be gleaned from this Biblical account seem to have been either overlooked or not applied in compiling the highly publicized and controversial Nathan report in which may be discerned the remnants of an old New Deal philosophy of "soak business."

Except in scattered instances, critics of the CIO-inspired report appear to have neglected to place the emphasis deserved on the fact that corporate profits earned during fat years, if turned back into the corporation, provide the modern bins of Joseph upon which industry must draw if it—and its workers—are to survive the lean years which inevitably must appear.

A severe drain has been imposed upon the profit bins of the supposedly lush years of a wartime boom. Since the war, employment and payrolls have been maintained at the highest peaks known to peacetime history, thereby refuting gloomy predictions by government economists of widespread unemployment during the reconversion period. Shortages of materials and price and other controls over business combined to make the switch-over from war to peace doubly difficult. In many instances, many types or segments of industry suffered huge losses while the nation struggled to once more get back onto an even keel.

Yet, despite the high cost of labor (as compared to that of prewar) virtually all employables who want to work have consistently had jobs. A great deal is made of this fact in John D. Small's final report to President Truman concerning the transition of the nation from wartime to peacetime production.

"UNEMPLOYMENT never exceeded 2,700,000 which it reached in March 1946 after the big demobilization wave," Mr. Small said. "During the latter part of the year (1946) employment remained around 58 million, highest in the nation's history. All but 900,000 of the 10.5 million service men and women released by the armed services since VJ-Day have been absorbed into the peacetime economy."

In effect, through this maintenance of high payrolls during the reconversion period, industry has been working toward a goal established by labor itself—spreading of work. Without profit margins to make it possible to accumulate reserves, there is no gainsaying that over recent months the employment story would have been different. Layoffs would have been longer in duration and far more extensive in their effects.

Although it might have proved better in the end to have ignored the CIO-Nathan report altogether, industry and its defenders generally have been quick to accept the gantlet and spring to the defense, challenging various points. In a detailed analysis of the document, the Machinery and Allied Products Institute declares that the report is "dangerously erroneous" in asserting that wage increases averaging 25 pct could be made without price advances in manufactured products.

Directing its rebuttal largely to the question of whether profits are excessive and whether wage increases can be effected without increasing prices, MAPI declares in answer to the first, that when measured in terms of relationship to national income "profits are below the standard of peacetime high employment years as far back as the record goes."

IN support of its statement, George Terborgh, director of research, brings out that since 1909, corporate profits have averaged from 9 to 10 pct of national income in every year of substantially continuous full employment. Even should the Nathan report be correct in its estimate that corporate profits in 1946 will amount to $15 billion (after taxes), this figure still represents less than 9 pct of the national income which is presently estimated at about $170 billion.

Using the Nathan figures for argument, Mr. Terborgh points out that the report fails to allow for temporary inventory appreciation because of increased costs of industrial raw materials over the past months. This, he asserts, would lower the figure by three billion plus an additional billion to compensate for under-depreciation of assets in the light of higher replacement cost.

Thus, Mr. Nathan's $15 billion corporate profits would shrink to $11 billion or approximately 6.5 pct of national income, according to the MAPI analysis.

Turning to the question as to whether wages can be increased 25 pct without compensating price adjustments, Mr. Terborgh again uses Mr. Nathan's own figures in rebuttal. He declares that accepting the Nathan estimate $68 bil-

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lion paid in wages, a 25 pct increase would reduce corporate income to $5 billion (after taxes). After adjusting this profit to eliminate temporary inventory appreciation, the figure would now stand at $2 billion corporate profits or slightly more than one pct of national income. This, obviously is out of the question.

"So long as economic activity runs high," MAPI's research director declared, "there isn't a ghost of a chance that general wage increases will be substantially absorbed at the expense of profits. The absorption may occur later and indirectly if the resultant price rise dries up demand and precipitates a down-swing in production. It is then that profits shrink relative to wages. . . . (This) is surely no more advantage to workers than it is to industry."

BLUNTLY terming the Nathan report as "statistical nonsense," Dr. Ralph Robey, chief economist of the National Assn. of Manufacturers, fired industry's second major blast at the report when he declared that it not only misinterpreted statistics and other data but set a goal which would be impossible to attain.

There are only two alternatives, he said. One is to hold wages steady and thereby keep the way open for competition and buyer resistance to hold prices to proper levels; or, give another round of wage increases and thereby force prices still higher, which—as shown by earlier experience in 1946—would just about equal the amount of wage increases.

Obviously, the NAM economist declared, the latter course could not possibly be in the public interest. Only the first alternative—keeping the way open for the forcing down of present prices through consumer resistance—offers the proper solution to the problem.

In support of his case, Dr. Robey cited more than 25 specific items of common use which have declined in price in recent weeks. This trend could not but be reversed if wages generally were given another boost, he explained.

The NAM economist sharply criticizes Mr. Nathan's selection of statistics to show that prices have risen more than wages. He offered his own analysis to refute the Nathan figures and conclusions.

"By taking January 1945, the peak month of weekly wage income as his (Nathan's) starting point (with 100 as the index for both wages and prices), he showed that the wage index is now 96.5 as compared with the consumer price index at 116.8," he asserted. "But if 1939 is taken as the starting point, the chart turns out to be quite different. In this

"SIMILARLY," the NAM spokesman said, "the report of the Heller committee (University of Calif.) has been misinterpreted in showing that income from wages is below the required minimum standard.

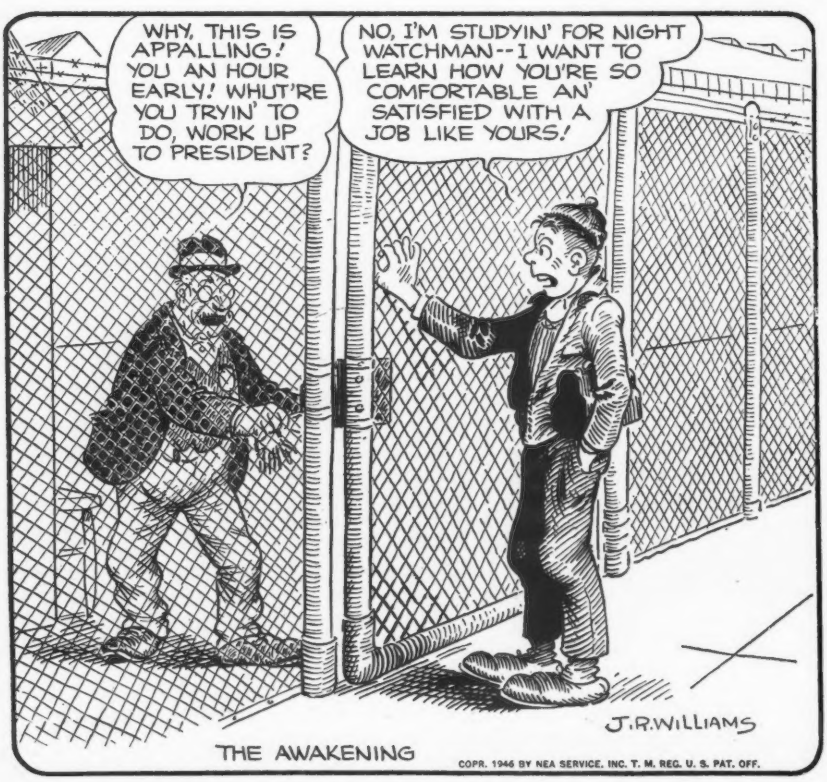
"The official figures of the Bureau of Labor Statistics for January 1946, when adjusted for subsequent increases in cost of living, give $44.23 as the break-even weekly pay of a family with one wage earner. In manufacturing industries, the average pay in October 1946 was $45.83."

On the basis of Mr. Robey's interpretation of the Heller report, there would be no apparent justification—other than an attempt to cut the workers in on the supposedly big profits of 1946—for seeking new wage increases in either the steel or automobile industries, the most imminent negotiations to be settled. On the basis of BLS statistics released as of Oct. 1, 1946, the average wage of the iron and steel worker was given as $49.31 for a week of slightly less than 40 hr and that of the automobile worker as $53.12 for a 38.6-hr week. A 25 pct rise in steel wages would amount to nearly 30¢, thereby increasing the average pay to around $1.51 an hr.

One outstanding fact is that while the Nathan report went into great detail in breaking down hourly and weekly pay, it dealt only in round figures and estimates as to profits for all corporations."

Dr. Robey did break down listed profits by industries for the first 9 months of 1946 as compared with the corresponding period for 1945. These ran from an 86 pct decrease to 156 pct increase; for individual companies the range was even wider. This would seem to make it evident, regardless of the merits of any report, that an industrywide wage increase is not the answer.

THE BULL OF THE WOODS — BY J. R. WILLIAMS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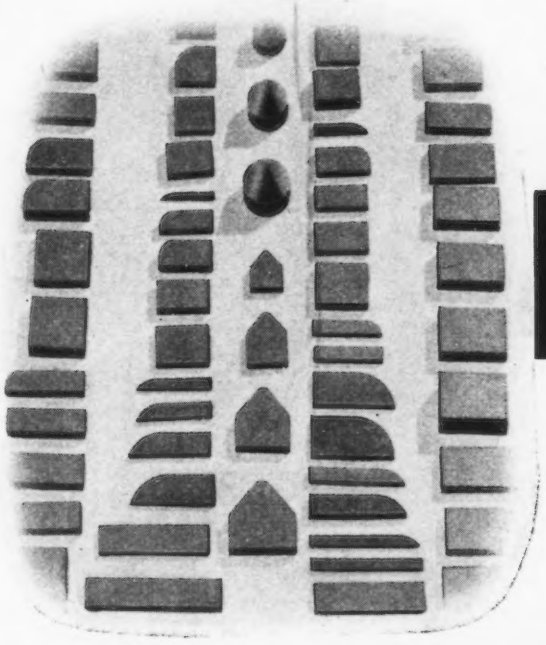

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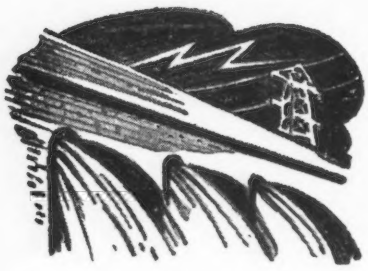
West Coast . . .

ROBERT T. REINHARDT

• Latest study of the western steel industry presents down-to-earth views of economists . . . Western Metal Congress expected to draw large attendance . . . Geneva looks for 80 pct production rate in 1947.



SAN FRANCISCO—In a comprehensive, penetrating and analytical voluminous report titled "The Steel and Steel-Using Industries of California," E. T. Grether, dean of the School of Business Administration of the University of California, without hyperbole states:

"The marked prewar upward trend of population and of manufacturing activities, the high level of per capita income, the increase in the proportion of the national income in California, the general locational advantages of California for manufacturing industries all point indubitably to a substantial long-range advance in manufacturing (as well as in other economic activities) in the state. . . . There are some important offsetting factors. The larger markets are still in the East along with the broadest agglomeration of industries, materials, fuels and know how.

"It is possible only near the center of this eastern and midwestern market and industrial area to exploit the economies of mass production to the optimum point in those fields in which such economies are important.

"Established eastern firms often have strong marketing and selling advantages. Very important will be the war-induced excess capacity which was built into the older industrial areas and which will eventually clamor for markets."

Mr. Grether's report was prepared for the State Reconstruction & Reemployment Commission and represents 18 months of concentrated study by the author and a staff of collaborators determined to assay impartially the prewar development, wartime adjustments and long run outlook for the steel and steel-using industries of the state.

In the course of this extensive study, the author had complete and wholehearted support from both primary steel producers of the West and steel-using industries which resulted in a volume probably more authentic and detailed than anything similar that has preceded it in this area.

In his summary, Mr. Grether answers the question as to the future net development in steel and steel-using industries by stating:

"It seems entirely reasonable that they will move up at least to the same extent as manufacturing in general, most likely, more so, since they lie at the base of industrialization."

IT is shown that while ingot tonnage has increased in the West since prewar years to the point where the western states supply about 5 pct of the total tonnage of the country, there is a dearth of finishing facilities which must be remedied if this industry is to achieve its maximum utilization and prosperity. In commenting on the production of steel in the West as a whole, Mr. Grether states:

". . . production in the steel, as well as in many of the leading steel-using industries, expanded sharply during the war, and in spite of cutbacks, was holding substantially above the prewar level, at the beginning of 1946 and was, in some cases, showing signs of short-run advance. It was seen from the estimates of members of the industries, nationally and locally, that sizable percentage increases in volume of operations over the prewar level are anticipated in the immediate period (as of 1947). However, this nationwide expectation is largely based upon backlog demand; hence, it indicates nothing about the western prospects once the backlog of demand has been fulfilled—except so far as the period of grace is allowed during which new enterprises or expanded facilities may become established in the West. Furthermore, these estimates often have entirely uncertain bases."

In one of his conclusions, Mr. Grether states:

"It would be a great mistake to sabotage the exterior market for products in which the state and region have marked comparative production advantages by trying willy-nilly to produce everything locally or by attempting to invade the national market without strong cost, price and selling advantages. A Pacific Coast commentator pointed out recently that 'a few business leaders apparently belong to the school of thought that believes almost anything that carries with it the odor of industrial smoke and increased payroll is worth trying.'

"On the other hand, the facts are (1) that California and the West must find employment for the greatly expanded labor force, (2) that industrial expansion is under way and is inevitable. The issue is to determine the lines of development within the steel-using industries which are most feasible and which will contribute most to regional and national economic welfare."

Unfortunately, the author of this study was handicapped, as is every researcher, by the lack of recent business census data and was forced to rely upon 1939 figures for some of his deductions and prognostications. Referring to that date, Mr. Grether states that:

"California steel-using industries, for which data were available, employed 4.22 pct of the persons reported in the United States, paid 4.42 pct of the wages and salaries, purchased 4.49 pct of materials, fuel, etc., and produced 4.55 and 4.61 pct of the value of products and the value added. Steel-using industries of California by 1939 had reached a level of about 2/3 of the state's percentage of the national labor force."

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the most profitable and inviting spheres of industry, Mr. Grether does set forth the potentiality of the factors upon which industrial success are based, such as labor supply and cost, the market, freight costs, scale of production and geographic association of industries, and the growth trend.

The volume contains numerous tables and charts which were developed after considerable research, study and compilation which probably are not available in any other such convenient form and so slanted as to be of primary interest to the steel industry.

Collaborating with Mr. Grether were R. A. Gordon, F. L. Kidner, D. Gordon Tyndall and J. T. Nichols.

In releasing this report, A. Earl Washburn, director of Reconstruction and Reemployment, for whom the study was made, states that a limited number of copies are available for general distribution from the Printing Division, Documents Section, 11 and "O" Sts., Sacramento, Calif., at $1.54.

OAKLAND—If advance hotel and exhibit space reservations are indicative, the fifth Western Metal Congress and Exposition to be held here for six days beginning Mar. 22 will break all records for attendance and manufacturer participation.

More than 150 exhibitors have reserved space and an imposing array of speaker talent has been signed up to participate in the 6-day program. Optimistic estimates of the American Society for Metals which is sponsoring the show, place possible attendance at 40,000 persons although the more conservative minded are willing to settle for 1/4 of that number.

Sixteen western divisions of technical societies are cooperating in the exposition and reports from exhibitors indicate there will be considerable emphasis on working and demonstrating exhibits to interest those concerned with the progress made in metal alloys, manufacturing and fabricating equipment, since the last similar exposition was held in this area in 1941.

W. H. Eisenman, managing director of the exposition, bases his optimism for the high attendance on that of the recently held National Metals Congress at Atlantic City.

E. S. Hudson, manager of the Western Forge & Tool Works of this city, is general program chairman and is assisted by C. D. D'Amico, metallurgist, Ryerson & Sons, Los Angeles.

SALT LAKE CITY—With the present abnormal backlog of demand for plate, structurals, slabs and pig iron, Geneva steel plant needs no diversification of products to find a ready market for its output at this time.

Orders are on hand or in prospect to keep the plant operating at more than rated capacity during 1947, according to officials. The limiting factor of Utah operations at the present time is said to be coal—both as to mining and transportation. To support capacity operation of all three blast furnaces, it is said that it would be necessary to boost coal production at the company's Horse Canyon mine to more than 6000 tons daily, or about twice the current rate of production. It is said that even if it were possible to obtain the manpower for such an increase, it definitely is not possible to house the employees at or near the mine site and that at the present time more miners have been recruited than can comfortably be housed.

Walther Mathesius, president of Geneva Steel Co., is setting his 1947 sights at about 80 pct of capacity production. The program to convert the plate mill to production of hot-rolled coils, he reports, can be carried on during the year without appreciable interference with current production of plate. Actual work on the $18½ million conversion job is expected to get under way some time during the second quarter of this year and it should be finished early in 1948. The original schedule has been pushed ahead because of the inability to get earlier deliveries on electrical and mechanical equipment.

DESPITE the fact that the CIO-United Steel Workers of America does not represent the Geneva plant workers, having lost two elections, that union has jumped into the portal-to-portal back pay picture by filing suit in District Federal Court here for approximately $2,300,000. Claims cover a period of 3 yr and about 2000 workers.

C. R. Van Winkle, AFL representative at Provo, issued statements accusing CIO of "interfering with something that is none of their business."

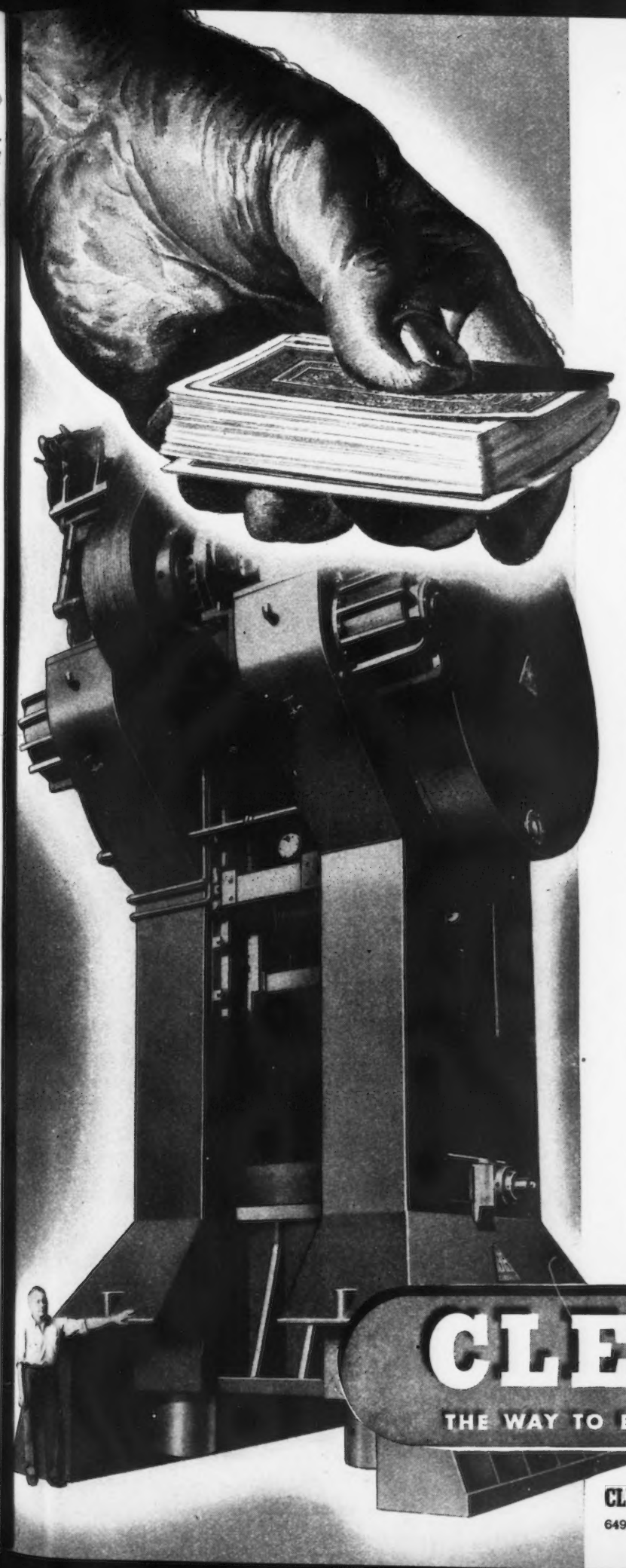
"The CIO case," he said, "is drawn up hastily and is not based on facts. It appears that the case was filed for publicity purposes solely. The travel time case is a complicated one and apparently the CIO has not taken into consideration the many factors involved—if they are aware of them. The extravagant claims of the CIO in the long run can only harm the workers involved."

The AFL, the statement added, "is preparing to bring a friendly suit—to establish the right of the workers."

The steel company suits, however, were not the first of this type filed in the state. Last February, before the Michigan pottery case touched off the rash of back-pay claims, the CIO-International Union of Mine, Mill & Smelter Workers began filing suits against Utah copper companies. This batch involved claims of about 2000 miners aggregating in the neighborhood of $3,500,000. The mining cases differ from the steel industry suits in that the claimants are relying on both state and federal law. Utah has a state portal to portal law for the mining industry. For years it has been generally assumed that the law applied only to underground mines, but the back-pay suits seek to extend it to open pit operations, such as are practiced at the Utah Copper Co. properties.

The Utah State Tax Commission has a little legal problem thrown into its lap through the sale of the Geneva steel plant to U. S. Steel Corp.

This commission is trying to determine the amount of sales tax, if any, that is owed to the state in connection with this sale. Apparently the amount of tax hinges upon a determination of just how much of the $47½ million paid to the government was for tangible personal property. J. Lambert Gibson, Commission Chairman, has stated that the tax might run as high as $½ million on the purchase. Under the Utah sales tax statutes, buildings and land and inventories which become a component part of the manufactured product usually are exempt, but in the past such things as equipment and ore, have been subject to sales tax.



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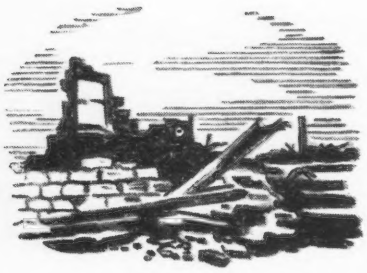
European Letter . . . JACK R. HIGHT

• British steelworkers benefiting under guarantee of four shifts of work per week . . . Effect is that of guaranteed annual wage, but employers retain an out in case of material shortages.



LONDON—What amounts to an annual wage plan for steelworkers was introduced in the United Kingdom some months ago, and is now becoming a standard part of agreements between employers and unions in this country. The guaranteed wage, or "guaranteed employment plan," as it is called here, is computed on the basis of an assurance on the part of employers to provide four shifts of work per week per man, rather than on an annual stipulated sum.

The widespread adoption of a guaranteed wage system is a direct outgrowth of the directed labor system in effect here during the war. When, early in the war, the necessity for some system of compulsory work was recognized, labor demanded that in return the employer give some assurance of a full wage. The result was the enactment of the Essential Works Order providing for a full week's work for each laborer.

As the war ended, the pressure from all sides to end the noxious directed labor program was strong, and the labor government moved as rapidly as it could to remove the essential works order from as many industries as possible. In every case where the order was lifted with respect to a particular industry, the government gave several months' warning and advised both labor and management to make preparations in advance for the smooth transition to a system whereby labor could leave the job when it so desired, and whereby management could once more take over the right to fire a man. For the steel industry the essential works order was lifted last May, and consultations between the British Iron & Steel Trades Confederation and the Iron & Steel Trades Employers Assn. took place some weeks before the order was lifted.

THE outcome of these discussions was the decision to guarantee four shifts of work each week in place of the six shifts which had been assured under the essential works order, although there are notable additional clauses in the contracts which relieve the responsibility of the employer in a number of cases which are regarded as being beyond his control. The contracts state that in any case where any mill is idle for lack of raw materials, fuel or power the guarantee shall not apply.

I was rather curious concerning the broad implications of such a clause in the agreement which it seems evident would make it possible to almost completely negate the purpose of the guaranteed wage if an employer so chose, but trades union officials here assure me that the steel industry is applying it in the best of good faith, and that in effect no unreasonable interpretations are being made of this clause.

Before the war there was no history of a guaranteed weekly wage in the steel industry. Before the steel agreements were drawn up the engineering industry and the building trades industry developed plans, both of which guaranteed a 34-hr week for their laborers, and, with variations, the steel plan is drawn from experience gained in those industries.

THE building trades program was developed essentially as a protection for workmen against the vagaries of the weather, but in the engineering industries as in steel the primary problem was to eliminate periodic slack periods. The steel unions, however, did not approve of the agreements in the other industries based on an hourly figure for the week, which made it possible for a firm which paid double time for Sundays to work a man through Sunday and possibly by Monday night his 34-hr minimum might be worked out, in which case he might be off for the remainder of the week.

This was the principal reason for the steel agreement being drawn up on the basis of a fixed number of shifts, rather than upon the hourly minimum. The unions went into the negotiations hoping to obtain a six shift minimum, the same as was effective under the Essential Works Order. The employers on the other hand suggested that there was no question of a precedent as this was a consideration of a permanent nature and would necessarily have a basis compared with the prewar situation when no minimum of any type was in effect. In spite of this fact it seems likely that the employers' original figure was an offer of a four shift minimum and this constituted the official decision.

There are certain limitations upon the amounts of payment which a workman will receive during the guaranteed period. The unions have agreed that where a laborer's normal work is not available to obtain the guarantee, the workman must be willing to accept reasonable alternative employment, in which case he is to be paid on the basis of 90 pct of his own rate up to a maximum of approximately $5 per shift, or, if the alternative work pays a better rate than the $5, he is to receive the regular rate for the alternative work.

THERE are certain alternative clauses included in most of the agreements aimed at discouraging certain practices of which management has complained in the past. The guarantee does not apply to the worker who has been absent without satisfactory cause during the three preceding working weeks. This clause is aimed at the special conditions in parts of the British industry which result in each man working one Sunday night shift every three weeks.

In the past Sunday night has been a favorite absentee shift among a few workers and has occa-

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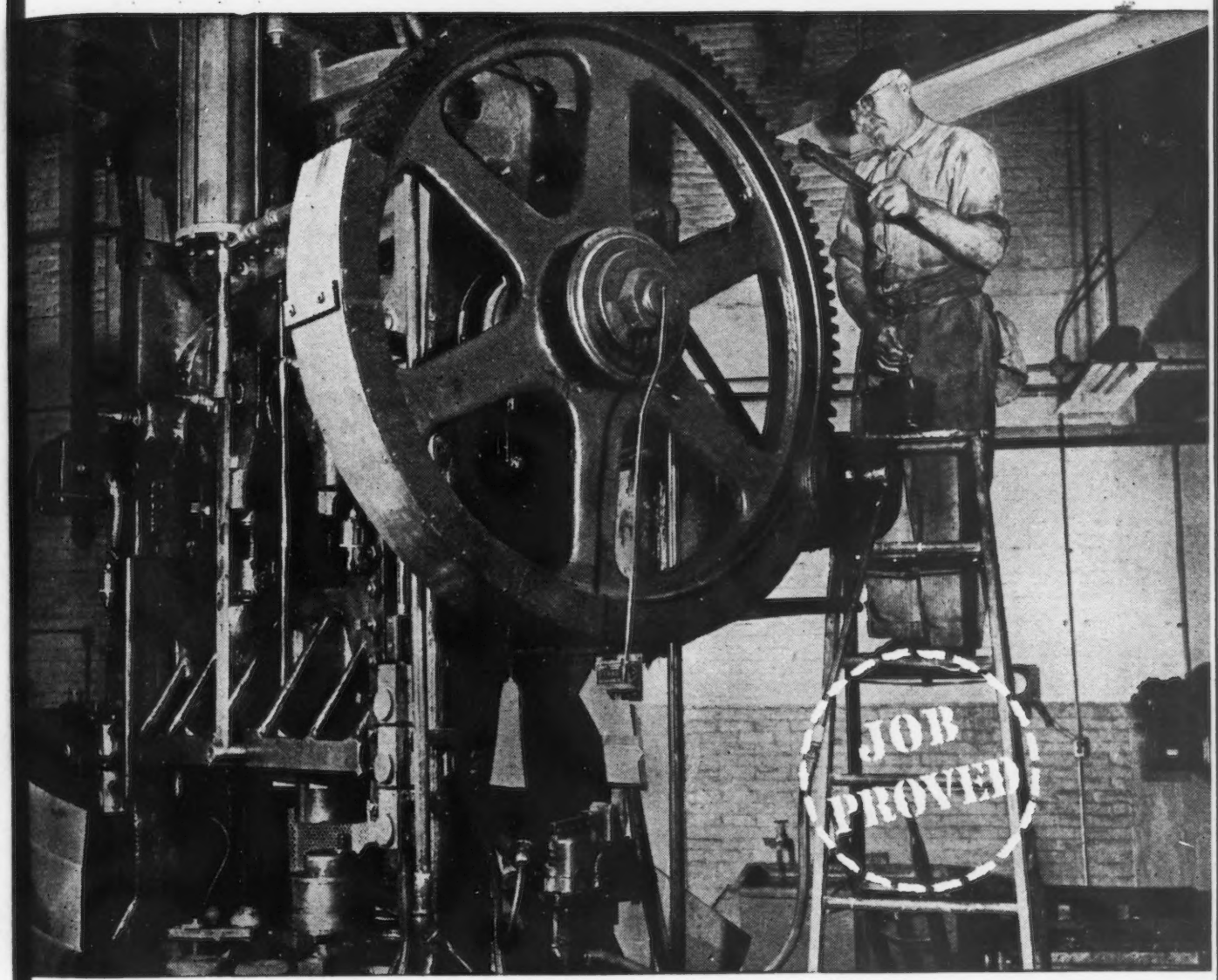

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This is just one of the scores of special "Job-Proved" products with which Sun Engineers are helping factories, mills, mines and other industrial plants to cut costs, speed up operations, or improve quality. For lubricants for all types of machinery . . . for Diesel, compressor or turbine oils . . . for hydraulic oils . . . for cutting oils, spirits or other petroleum products . . . call the nearest Sun office today.

SUN OIL COMPANY · ***Philadelphia 3, Pa.***
Sponsors of the Sunoco News-Voice of the Air — Lowell Thomas

SUN
SUNOCO
INDUSTRIAL PRODUCTS

sionally caused disruptions of production. It was necessary therefore to make the clause read back as far as three weeks to catch those few who made a habit of such procedure. Stoppages or dislocation of production caused by strikes is also recognized as sufficient cause for the management to be excused from the guarantee. This clause was not received well in certain quarters of the rank and file of the unions, but was recognized inasmuch as to do otherwise might put the employers in the position of actually subsidizing a strike within their own works.

The guarantee is also ineffective in any case where a production unit is closed down because of unavoidable absenteeism. This clause was included to prevent a team of men on one unit suffering from the absence of one or two members. A suspicion arose during the war that sometimes unscrupulous men laid off deliberately to enable their fellows to benefit from the Essential Works guarantee.

The $5 per shift payment which is the effective maximum for alternative employment, compares with an average minimum of $18 per week, which is the lowest rate for labor in the industry. This figure includes a basic rate of $1.20 plus an addition of 67½ pct, which before the war was on a sliding scale basis computed on the current price of ship plates, but at present is frozen due to a continuation of the uncertain market conditions which developed during the war.

To make up for the freezing of this sliding scale bonus, a cost of living bonus is now paid, based on the government index which adjusts workers' incomes to their need. There have been intermittent suggestions from the workmen that the cost of living bonus should be eliminated, and the old sliding system should be adopted, which would add to workers' incomes as steel prices go up, but conservative elements in both the managements and the unions consider that up to the present it is more advisable to maintain the cost of living system.

POCKET RADIO: *Developed by Tele-Radios, a British firm, for the Government, this midget set has a transmission range of half a mile. The microphone can be concealed under the lapel while the receiver looks like a large hearing aid. Michael Kasis, one of the set's developers, poses with the unit, which is designed for use with a master set.*

Export Order Extended

Washington

• • • **To insure continued** equitable distribution of farm type wheel and tracklaying tractors between domestic and export needs, CPA has extended the life of the tractor export order, L-356, to Mar. 31, 1947.

L-356, which limits export shipments of these products to amounts permitted by CPA, was originally scheduled to expire on Dec. 31, 1946.

CPA said that extension of the order was necessary because of the extremely heavy domestic demand plus the pressing requirements for UNRRA and other urgent export needs.

Permitted export ceilings for individual tractor manufacturers will be issued shortly.

Hunter to Continue To Head Steel Federation In England for 1947

London

• • • **The British Iron** & Steel Federation has announced that Ellis Hunter, managing director of Dorman, Long & Co., will stay in office as president of the federation for another year "in response to a unanimous request" by the council of the organization.

No mention was made in the announcement of the previously chosen G. H. Latham, chairman of the Whitehead Iron & Steel Co., but it is assumed in "usually well-informed circles" that the federation will not have two presidents during the coming year, and that the retention of Mr. Hunter will mean that Mr. Latham will not serve.

Custom in some circumstances in the United Kingdom might dictate that Mr. Latham, who was appointed last September to the government's Iron and Steel Board which now controls the industry in this country, would not be permitted to serve simultaneously in such a high post on both the industry and the government side.

On the other hand, there is always a certain amount of speculation in the air when the federation takes any action with regard to Mr. Latham, as industry officials have never forgotten his position as a holdout against the federation's power in prewar days. The mystery of his sudden joining up with the federation after years of recalcitrant opposition has never been publicly solved.

Whether, or rather how much, the issue has to do with possible nationalization of steel is the subject of still more guessing. There is no secret of the fact that the federation is thinking now in terms of a fight to the last ditch, but whether this change of No. 2 heads (the president serves under the independent chairman, Sir Andrew Duncan) is an effort to strengthen the leadership for the crisis is still unknown.

A few notes . . .

on how Ohio Ferro Alloys help the Iron and Steel Industry

Memo
FERRO-SILICON
50% - 75% - 85% - 95%
Clean . . . uniform products for consistent results

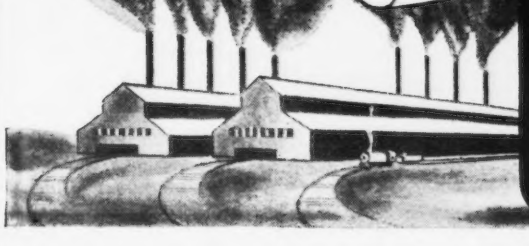
Memo
SPECIAL BLOCKING 50% FERRO-SILICON
for efficient and economical blocking practice

Memo
H. C. FERRO-CHROME
Top Quality in every respect

Memo
SIMANAL
to improve aluminum additions . . . better distribution of inclusions

Memo
Careful consideration of your requirements . . . prompt service
●
Practical metallurgical assistance

FERRO-SILICON 50% - 75% - 85% - 95%
SPECIAL BLOCKING 50% FERRO-SILICON
H. C. FERRO-CHROME • FERRO-MANGANESE
BOROSIL • SIMANAL
Briquets
SILICON • MANGANESE • CHROME



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Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago Detroit Pittsburgh San Francisco Tacoma

PERSONALS

HARVEY HEWITT, vice-president in charge of sales, Bethlehem Pacific Coast Steel Corp.

• **Harvey Hewitt,** formerly manager of sales of the Los Angeles district, Bethlehem Pacific Coast Steel Corp., has been made vice-president in charge of sales, succeeding **Paul W. Cotton,** who has retired. **William J. McClung,** formerly general manager in charge of operations of steel plants and mill depots, has been made vice-president of that division of the company, succeeding **T. S. Clingan,** also retired. **Lionel J. Soracco,** general superintendent of the company's Los Angeles plant, succeeds Mr. Hewitt as manager of sales, Los Angeles district. **J. T. Rea,** in charge of new construction at that plant, succeeds Mr. Soracco as general superintendent. **Willard S. Briscoe** has been made manager of publications, in charge of a newly created public relations department. Mr. Cotton and Mr. Clingan came into the Bethlehem organization in 1930 when the Pacific Coast Steel Co., with which they had long been associated, was purchased by Bethlehem Steel Co. Since that time they have managed West Coast sales and operations. Mr. Hewitt has been in West Coast steel sales for 23 yr as manager of bolt and nut sales for the Pacific Coast Steel Co. and manager of sales of the Los Angeles district for Bethlehem. Mr. McClung, before coming to Bethlehem Pacific in the summer of 1946, was assistant to the general manager at the Bethlehem Steel Co.'s Lackawanna plant. He will supervise operations at the company's steel plants in Seattle, S. San Francisco and Los Angeles, and four mill depots in Seattle, Portland, San Francisco and Los Angeles. Messrs. Hewitt, McClung and Briscoe will make their headquarters at the general offices of the company in San Francisco.

• **William C. Moreland,** after nearly 62 yr service, has severed his connection with the Jones & Laughlin Steel Corp., Pittsburgh, by resigning as a member of the board of directors. Ten years ago, Mr. Moreland resigned from the active duties of vice-president and member of the executive committee, retaining his membership on the board of directors. He entered the employ of Jones & Laughlins, Ltd., in 1885 in a clerical capacity under the late B. F. Jones, founder of the business. Subsequently he became private secretary to Mr. Jones and successively held other offices of trust, advancing to secretary and then to vice-president and member of the board and the executive committee. **Carl W. Littler,** chief engineer of Jones & Laughlin Steel Corp., and its subsidiaries, has also retired. He came with Jones & Laughlin in 1925 as chief engineer at the Aliquippa works. In 1929 he was made the chief engineer of the corporation and from 1941 to retirement has been chief engineer of all J&L subsidiaries as well.

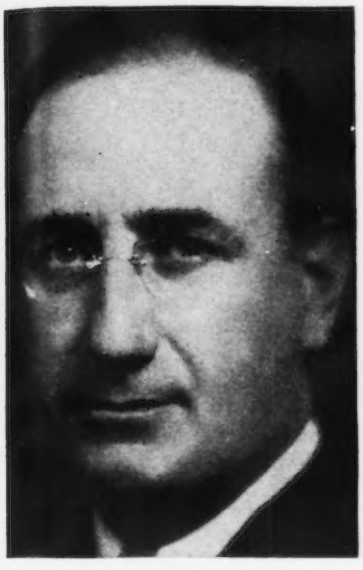
• **F. J. Kaib,** secretary-treasurer and director of the National Roll & Foundry Co., Avonmore, Pa., has resigned. He has been actively associated with the company since its organization more than 37 yr ago.

• **Paul H. Rutherford** has been named special assistant to B. D. Kunkle, vice-president of General Motors Corp. and group executive in charge of the Overseas, Canadian, Dayton and Household Appliance Group, Detroit. Mr. Rutherford was previously employed by General Electric Co. He joined the Dayton Engineering Laboratories Div. of GM in 1926, and was appointed chief engineer of Delco Products Div. in Dayton in 1936. He has been with the GM personnel staff in Detroit since 1942.

H. C. CRAWFORD, vice-president in charge of traffic, Bethlehem Steel Co.

• **H. C. Crawford** has been elected vice-president in charge of traffic of Bethlehem Steel Co., Bethlehem, Pa., succeeding **J. M. Gross,** who has retired after 30 yr of service. **F. M. Huffman** has been named general traffic manager. Mr. Crawford's first business experience was with the traffic division of U. S. Steel Corp. In 1914 he became a special agent for Cambria Steel Co.; was appointed its eastern traffic manager in 1915, from whence he moved to the Midvale Steel & Ordnance Co. as traffic manager. When Bethlehem acquired Midvale in 1923, he came to Bethlehem as assistant general traffic manager, later became traffic manager, and in 1937 general traffic manager, in which capacity he has served until the present time. Mr. Huffman has been affiliated with the company throughout his business life. He has been located successively in Philadelphia, Chicago, St. Louis and Baltimore, and in 1940 was transferred to the general headquarters of the company at Bethlehem as assistant general traffic manager. In 1944 he was made traffic manager. Mr. Gross came to Bethlehem from the post of assistant general freight agent for the Pennsylvania R.R. At that time he was named general traffic manager for Bethlehem Steel, and for the past 20 yr he has been vice-president in charge of traffic.

• **Henry P. Bruner,** Wisconsin intercity bus executive, has been elected president of the reorganized Speed-Meal Co., Racine, Wis.



C. J. SHARP, executive vice-president Acme Steel Co.

• **C. J. Sharp** has been elected to the newly created office of executive vice-president of Acme Steel Co., Chicago. He was formerly vice-president, director of sales. **John E. Ott** has been named general manager of consumer products, and **Allen B. Wilson,** general manager of producer products. **Guy T. Avery,** formerly works manager, Riverdale plant, has been elected to the newly created office of vice-president and manager of production, all plants. **B. Richards** has been named assistant to vice-president and manager of production. **W. C. Fork** has been appointed works manager, Riverdale plant, to succeed Mr. Avery, and **F. R. Hyde** has been named superintendent, Archer plant.

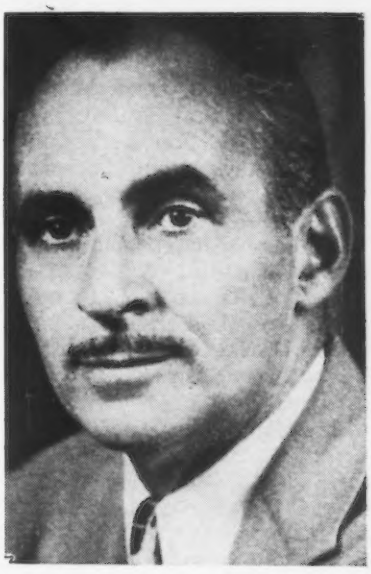
• **Philip W. Pugh** has been appointed manager, range sales, of the Crosley Div., Aviation Corp., Cincinnati. Mr. Pugh has been affiliated with Crosley as promotional manager of the central region since November 1945.

• **Ivan L. Willis** has been elected a vice-president in charge of industrial relations of the International Harvester Co., Chicago. Mr. Willis, who came to International Harvester in February 1946, was formerly assistant to the vice-president of that organization. He started his industrial relations career with the Carter Oil Co. and in 1941 was named director of industrial relations for the Curtiss-Wright Corp.

• **Hugh D. Largey** has been appointed manager of refractory sales for Basic Refractories, Inc., Cleveland. He has been regional sales manager for Basic Refractories for many years and will move to Cleveland immediately to direct and coordinate sales of the entire eastern portion of the United States and Canada, under the direction of Samuel Eells, vice-president. **D. B. Baxter,** now assistant to Mr. Largey, succeeds him at Pittsburgh with the title of district manager. **George W. Edwards,** formerly melter at the Republic Steel Corp. plant at Buffalo, becomes assistant sales engineer at Pittsburgh. **Harvey N. Barrett, Jr.,** who has been serving as manager of sales development since his return from military service, has been appointed assistant to the president, Howard P. Eells, Jr. **Gordon E. Tomb,** assistant sales engineer for the Cleveland district, becomes manager of the company's gun sales, remaining in the Cleveland office.

• **John A. Fry** has been elected to the board of directors of Detroit Steel Products Co., Detroit. Mr. Fry is president of Detroit-Michigan Stove Co., also of Detroit.

• **J. Halsey McKown,** assistant vice-president of sales, U. S. Steel Corp. of Delaware, Pittsburgh, has retired after more than 41 yr of service with U. S. Steel subsidiaries. Mr. McKown was first employed by Carnegie Steel Co. as a clerk. He was appointed assistant vice-president and assistant general manager of sales of Carnegie-Illinois Steel Corp. in 1935, and 3 yr later was made assistant vice-president of sales of the Delaware Corp. **Harold L. Challenger** has been appointed assistant sales organization counsel for the U. S. Steel Corp. of Delaware. He has served for the past 29 yr in the U. S. Navy. **G. R. Schreiner** has been named assistant director of advertising of the corporation. Formerly advertising manager of Carnegie-Illinois Steel Corp., he succeeds **Reese H. Price,** who has resigned. **Robert J. Wilcox** has been appointed acting advertising manager of Carnegie-Illinois to succeed Mr. Schreiner. Mr. Wilcox came to Carnegie Steel in 1930. He joined the advertising division in 1940, and since 1943 has been assistant to advertising manager.



A. R. STARGARTDER, chief metallurgist, Washington Steel Corp.

• **A. R. Stargartder** has been named chief metallurgist of the Washington Steel Corp., Washington, Pa. Mr. Stargartder was formerly chief metallurgist for the Eastern Stainless Steel Corp. and prior to that, chief metallurgist for the Gillette Safety Razor Co. During the war he served as a member of the War Production Advisory Committee.

• **T. E. Anderson** has joined the sales organization of the Ohio Ferro-Alloys Corp., Canton, Ohio, coming from the industrial sales division of National Gypsum Co., Pittsburgh district.

• **R. R. Morgan,** president of the Cleveland Rock Drill Co., recently acquired by the Le Roi Co., Milwaukee, has been elected vice-president of Le Roi in charge of the Cleveland Div., and **T. O. Liebscher,** who was re-elected secretary, has also been made a director.

• **Otto Gminder,** manager of sales, structural shapes, Bethlehem Steel Co., Bethlehem, Pa., has retired. He has been associated with Bethlehem since 1908. He is succeeded by **Francis L. Stephenson,** who has served in various sales capacities since 1928. **Kinter Berkebile,** of the Chicago sales office of Bethlehem Steel Co., has retired. Mr. Berkebile has been in charge of wire and wire products sales in addition to supervising the large special accounts of farm and car-building equipment since 1923.

• **B. M. Stubblefield,** assistant general superintendent, Campbell works, Youngstown Sheet & Tube Co., Youngstown, Ohio, has been appointed general superintendent of the Campbell works steel plant, blast furnaces and Struthers works. **J. S. Stanier,** superintendent of the hot and cold strip mills, has been named general superintendent of flat-rolled and tubular mills at the Campbell works. **W. H. Yeckley,** superintendent of the Brier Hill works of Youngstown Sheet & Tube Co., has been appointed general superintendent at Brier Hill. **C. J. Daley,** assistant superintendent of the sheet and cold strip mill, has been named superintendent of the cold strip mill. **J. E. Finnie,** assistant superintendent of the hot strip mill, has been appointed superintendent of that unit.

• **Robert W. Cary** has been appointed director of the planning group, office of the president, for Willys-Overland Motors, Inc., Toledo. His appointment followed his formal retirement from the Navy after 36 yr of active duty.

• **Einar Larsen** has been named chief project engineer in charge of the engineering development of the Eagle Mountain, Calif. iron ore deposits for Kaiser Co., Inc. He joined the Kaiser organization in 1941.

• **N. S. Prime,** recently discharged from the Navy, has been appointed director of engineering, and **William C. Morgan, Jr.,** who served in the Army, has been made sales manager of the original equipment division of the Walker Mfg. Co., Racine, Wis.

C. E. HERINGTON whose appointment as manager of the sales engineering department of the Meehanite Metal Corp. was announced in the Dec. 26 issue.

• **B. B. Anderson** has been appointed senior contracting manager in the American Bridge Co.'s New York office. He succeeds **B. P. Talbot,** who has retired after 45 yr with the company. Mr. Anderson began with American Bridge Co. as a draftsman in 1916.

• **George R. Ingersoll** has been appointed manager of distributor sales of the National Screw & Mfg. Co. of Cleveland. He will also have full charge of the company's spoke and nipple sales to both manufacturers and distributors. He has been with National for 22 yr, all of that time in the sales department. Until this promotion he was district sales manager for the Cleveland area.

• **Deppen Kline** has been appointed Buffalo district sales manager, Bliss & Laughlin, Inc., with headquarters at Buffalo. Prior to joining Bliss & Laughlin in 1937, Mr. Kline was at the Lackawanna plant, Bethlehem Steel Co. During the war period, he served with the WPB and in the U. S. Navy. He rejoined Bliss & Laughlin, Inc. in February 1946.

• **Vere B. Browne** has retired as vice-president and technical director of the Allegheny Ludlum Steel Corp., Pittsburgh. He became chief chemist of the Allegheny Steel Co. in 1909, served as vice-president for 16 yr and technical director for 3 yr. He will become an honorary vice-president and will be available as a consultant. **Frank B. Lounsberry,** vice-president in charge of methods and processes, succeeds Mr. Browne as technical director.

• **Willard K. Fohl** has been appointed manager, railroad division of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa. Mr. Fohl has been associated with Lukens Steel since 1937, serving in the research and openhearth departments until 1939 when he was named assistant research metallurgist. He was employed in that capacity until the present time except for 2½ yr active duty with the Navy.

• **Stanley C. Hope** has been made president of Stanco, Inc., New York, succeeding F. W. Moss. Mr. Hope is also president of Gilbert & Barker Mfg. Co. Both companies are Standard Oil Co. of New Jersey affiliates.

...OBITUARY...

• **Carl O. W. Stolpe, Sr.,** 63, president and general manager of Mechanics Tool & Stamping Co., Worcester, Mass., for 24 yr until his retirement last February, died recently.

• **Robert G. N. Evans,** 56, president of the Evans Engineering Co., Milwaukee, died Dec. 18 from a heart attack.

• **Charles B. Thwing,** 87, pioneer in the field of pyrometry and president of the Thwing-Albert Instrument Co. in Philadelphia, died Dec. 12.

• **Mrs. Pearl E. Stokes** died Dec. 17 after several months of illness. She had been associated with the Detroit Die Set Corp., Detroit, for 17 yr and had been president since 1942.

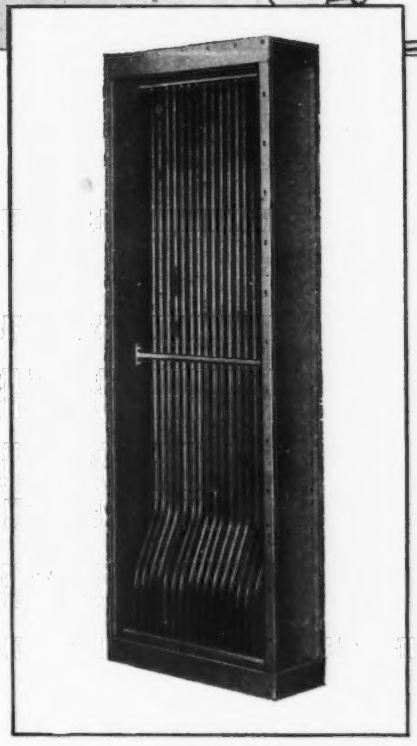
• **William B. Gold,** 66, purchasing agent, the Electric Storage Battery Co., Philadelphia, died suddenly on Dec. 15. He entered the employ of the company in 1900 and in 1913 became purchasing agent.

• **Arthur F. Wirtz,** secretary-treasurer of the Atlas Mineral Products Co. of Mertztown, Pa., died suddenly Dec. 16 of a heart ailment. He had been with the company since 1921.

• **Fred L. Pomeroy,** 65, traffic manager of the Vanadium Corp. of America, New York, died suddenly on Dec. 17.

• **William J. O'Neill,** 64, retired president and general manager of the Dodge Div. of Chrysler Corp., Detroit, died Dec. 15 after several months' illness.

Before you select ANY COIL

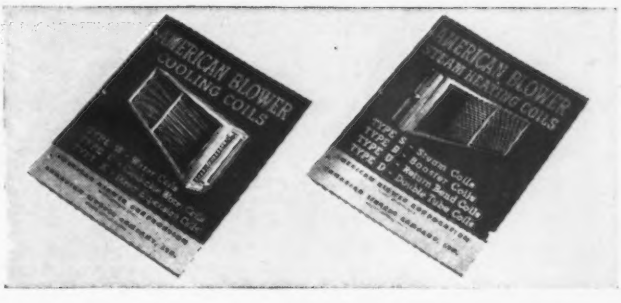


New American Blower Heating Coil

1 CHECK THE MAKER

When choosing the heating or cooling coil that will do the best job for your specific installation first consider the engineering background and reputation of the maker. You'll find in short order that American Blower is one of the oldest and largest designers and manufacturers of air handling, air conditioning, heating, cooling and cleaning equipment.

2 Then the next step . . . DO THIS



Send for these two new bulletins, prepared by American Blower engineers. They make the work of selecting the best in coils quicker and easier. We've been told these bulletins are the most convenient guides and references ever printed on the subjects of coil selection, sizing and installation. All material is authoritative and up-to-the-minute. Here's all the information you will need in concise, easy-to-understand form.

Call the nearest American Blower Branch Office for your copies today. Or write for Bulletins B-1218 and 1521.

AMERICAN BLOWER

AMERICAN BLOWER CORP., DETROIT 32, MICH.

Division of American Radiator & Standard Sanitary corporation
In Canada: CANADIAN SIROCCO CO., LTD., Windsor, Ont.

Dear Editor:

DAY OF PORTENTS

Sir:

I have seen in the Dec. 12 issue, the editorial, "Day of Portents," in which you referred to the Baruch proposals. We have gone a great part of the way but we cannot stop here. Of what value is control and inspection unless there is punishment of the infringement of control and inspection? Upon that I shall insist. Otherwise it will be another case of pious intentions, leaving a loophole for a malevolent nation at some time in the future to attempt, and perhaps succeed, in the destruction of some country or perhaps the world.

We must not permit any specious argument about unanimity or the charter to interfere with this fact, that once the nations of the world have agreed upon a treaty, none will have the right to violate it or to protect a violator by the use of the veto power. It is the spirit of the Preamble and the purposes of the charter "to take effective corrective measures for the prevention and removal of threats to the peace." That means swift and sure punishment set up in advance for there can be no debate. To debate will be but to die.

The same question will come up on general disarmament. Of what value will all the agreements be if there is no force behind the agreement so that one who surreptitiously arms can escape? World opinion and world power must be organized if we will have peace—a continuing peace for all mankind.

BERNARD M. BARUCH
597 Madison Ave.
New York

JOMINY, NOT P-V

Sir:

I have read your article entitled "The P-V Test," published in the Nov. 14 issue . . . and wish to draw attention to fig. 9, in which, while the coordinates show cooling rate v. distance from the end of Jominy test, one of the lines plotted is marked "P-V test." The connection seems rather obscure and is not fully explained in the text. Some clarification of this point would be greatly appreciated.

G. V. LUERSSEN
Asst. Chief Metallurgist
Carpenter Steel Co.
Reading, Pa.

● Thank you for calling attention to the discrepancy. The curve indicated "P-V test" is in error and should have been labeled "Jominy test," the Jominy specimen being prepared along the lines illustrated in fig. 10. Mr. B. F. Shepherd, who devised this hardenability test, advises us he has spare copies of P-V cooling rate data, which can be obtained by writing to him at Ingersoll-Rand Co., Phillipsburg, N. J.—Ed.

SENDZIMIR MILL

Sir:

I would like to get the name of the manufacturer of a rolling mill which rolls steel strip to a very thin gage. All the information I have is that this mill was designed or built by "Cendzimir Newton-Ohio" . . .

W. A. SCHUYLER
250 West 57th St.
New York

● The mill you refer to is known as the Sendzimir mill, invented by Thadeus Sendzimir, and described in THE IRON AGE, July 23, 1942, p. 55. Mr. Sendzimir can be reached at the Armzen Corp., 703 Curtis St., Middletown, Ohio.—Ed.

CONTROLLED ATMOSPHERES

Sir:

I would appreciate receiving a reprint of the three part article, "A Critical Survey of Controlled Atmospheres," by E. J. Funk and D. von Ludwig, appearing in the Sept. 19, 26 and Oct. 3 issues.

C. A. ZAPFFE
Consulting Metallurgist
6410 Murray Hill Rd.
Baltimore

● C. M. Kemp Mfg. Co., 405 E. Oliver St., Baltimore 2, reprinted the articles and we are certain they would be glad to furnish you a copy if you write to Mr. Frank J. Kohut, general manager.—Ed.

RESINOUS SEALANTS

Sir:

Your issue of Nov. 14 on p. 90 and 91 features "Resinous Sealants for Porous Castings." According to results listed in table I, types 13 and 14 seem the most satisfactory. Could you let us have the names and addresses of the fabricators of these two types of sealants?

M. ESSER
Chief Engineer
John Harsh Bronze & Foundry Co.
Cleveland

● National Bureau of Standards which conducted the investigations on various liquid synthetic resins to establish their effectiveness and durability as sealants for porous castings, advises us it is against its policy to release test results that might subject products to unfair comparisons. The Bureau, however, would be glad to answer direct inquiries about the inclusion of specific products in the series tested. We suggest you write Mr. E. C. Crittenden, associate director, National Bureau of Standards, U. S. Dept. of Commerce, Washington, for further information.—Ed.

STEEL SUPPLIERS

Sir:

May we have from you a list of the steel manufacturers in the U. S. that produce hot-rolled bars and sheets, cold-rolled sheets and silicon sheets. This year we have purchased in the U. S. roughly 20,000 tons of steel and want to enlarge our sources.

MEYER BRENNER
Acme Machine Co.
Toronto

● We are forwarding lists of manufacturers of the products you mention, including a separate listing of rolled or forged tool steel bar manufacturers.—Ed.

ZINC DIE CASTINGS

Sir:

We would appreciate receiving reprints or tear sheets of the articles on zinc die castings, by Herbert Chase, which have appeared in the issues of May 9, 23, 30, and Sept. 19.

RALPH H. HOPP
Technical Librarian
Battelle Memorial Institute
Columbus, Ohio

● Tear sheets of Author Chase's articles, "Preparing Die Castings for Plating," "Production Plating of Zinc Die Castings," and "Plating Auto Hardware," are being forwarded; unfortunately our supply of the May 9 issue containing the article, "Producing 70 Tons of Die Castings Daily" is exhausted.—Ed.

WAGON WHEELS

Sir:

Could you give us any information on where to buy wagon wheels and wagon spindles? We would like to build wagons for farm use.

C. J. CORNELL
Edwards Mfg. Co.
Lacеyville, Pa.

● We are sending you a list of manufacturers of wagon wheels, who undoubtedly can also furnish you with information on wagon spindles.—Ed.

TEAR SHEETS FOR HONOLULU

Sir:

Please send me p. 56 to 59, also 70 and 71 of the Sept. 12 issue, which are articles entitled "Flame Cutting and Welding in Bulldozer Manufacturing," by H. H. Washbond and O. F. Wilkinson, and "Gantry Aids Welded Tank Production."

GEORGE H. BAILEY
Qtrman. Shptr.
Pearl Harbor
Honolulu

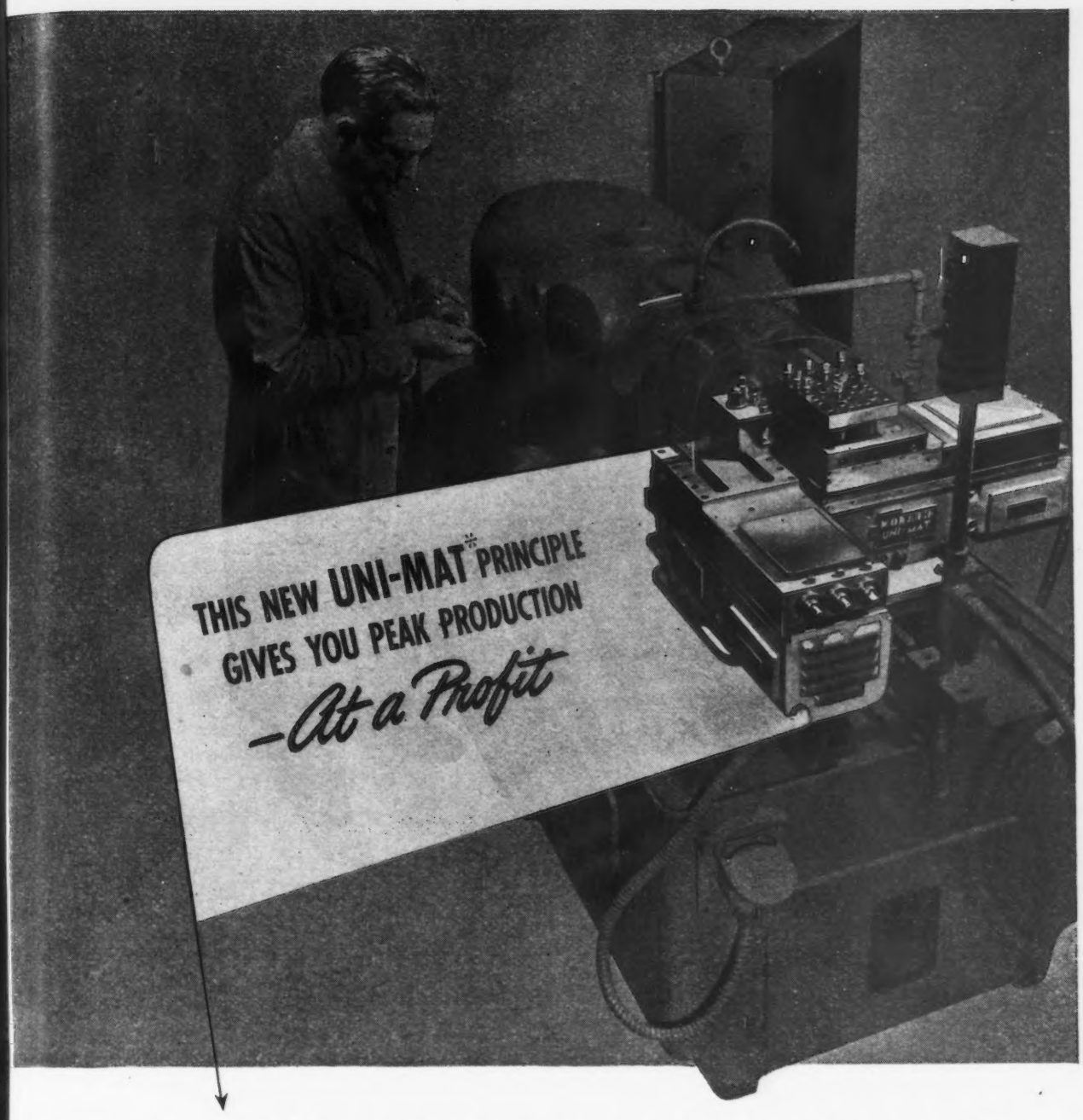
TIME STUDIES

Sir:

Please send us a copy of the book containing a reprint of the articles by David Anderson and A. H. Hansen, on "Method Simplification Applied to Time Study," which appeared in the issues of Aug. 17, Sept. 28, and Oct. 19, 1944.

R. GODDARD
Burndy Engineering Co., Inc.
New York

● The booklet which you request has been forwarded. Another booklet containing a series of articles covering time study calculations, method simplification as applied to time study, and incentive plans and job evaluation has also been published and is available at 60¢ a copy.—Ed.



If you're doing chucking work on bushings, bevel gears, bearing cups, bearing caps or disc shaped parts—as small as 1" and up to 16" diameter—you'll want to know all about Monarch's new universal automatic turning machine, the Uni-Matic.

Through application of the Uni-Mat principle, this revolutionary machine combines maximum production with universal adaptability. For the first time, you can profit by the advantages of automatic operation, no matter how large or how small the lots.

Uni-Mats can be used singly or in combinations of two or more. They can be interchanged. They can be positioned universally, through 360°. They can be brought up close to the work—for minimum overhang. They'll turn straight diameters or bevels with equal ease and accuracy. Equipped with tool relief, they're ideal for second operations. Electronic control not only makes their operation fully automatic but permits exact timing to eliminate cutting air.

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Industrial News Summary...

- **Major Steel Tieup Believed Remote**
- **Basis Being Set for Negotiations**
- **Steel Rate Advances to 90.5 Pct**

SIGNS were multiplying this week that the steel industry has a good chance of going through steel wage negotiations without a major tieup in production. Conditions this week are far different than they were a year ago and there are some indications that the meeting scheduled between U. S. Steel Corp. subsidiaries and the steel union heads for Jan. 16 in Pittsburgh may result in one of the first real collective bargaining meetings since prewar days.

It is almost a foregone conclusion that the U. S. Steel Corp. will make a moderate offer to Philip Murray which will form the basis of further negotiations leading towards an acceptable wage increase figure. One demand which could be a chief stumbling block in successful negotiations would be the failure of steel firms to agree to continue maintenance of membership which requires deduction of union dues from union members' pay.

The wage negotiations will be carried on at a time when steel output will have reached a level only surpassed by peak wartime periods. This week the ingot rate advanced four points to 90.5 pct, only one point below the postwar peak. Indications are that output next week will move up a half point or a full point.

HIGHER scrap costs, increased raw material prices and freight rate advances on materials used by the steel industry have forced all steel companies to raise prices much farther and on a broader scale than had been anticipated a few months ago. A substantial number of new steel price advances were made during the past week in addition to those already posted since a month ago.

Structural steel, plates and structural shapes have been raised $3 a ton. Some wire had been advanced $5 a ton, while billets, blooms and slabs—raw material for nonintegrated mills—have been advanced $3 a ton. Tinplate, which sold through 1946 at $5 a base box of 100 lb, despite permission last March to advance the price to $5.50, has been marked up for 1947 sales to $5.75 a base box of 100 lb. This represents a $15 a ton increase over the going price in 1946.

Some makers of low alloy high tensile steels, the use of which has been growing by leaps and bounds, have marked up quotations as follows: Up $13 a ton on plates; $8 a ton on structurals; $6 a ton on bars; $3 on bar shapes; $5 on hot-rolled strip; $5.50 on hot-rolled sheets; and $4.50 on cold-rolled sheets.

Many of the above price changes are not reflected in THE IRON AGE finished steel composite price, but components in this index represent a substantial proportion of total finished steel items. The index this week stands at 2.87255¢ per lb compared with 2.83599¢ per lb last week, an increase of 73¢ a ton. In the past month this weighted composite reflects an increase of $3.31 a ton on finished steel products. Additional extra changes have been made and are being made which will result in higher net cost to steel consumers.

WHILE steel companies insist that the recent flurry of price advances which have now turned out to represent a general advance are necessary to cover items made at a loss, higher scrap prices, advances in raw material prices and increased freight rates, there is a distinct possibility that the industry will be in a fair bargaining position when wage negotiations start. If the demands made by the steel union are temporized with the offers made by steel companies, no substantial across-the-board further increases in steel prices are expected at the conclusion of the wage demand meetings.

Scrap prices this past week were generally firm despite some evidence of weakness beneath the openhearth grades. Openhearth prices were off 50¢ a ton at Chicago but this was not considered to be a major market trend either in that area or in other locations, for the time being at least. THE IRON AGE scrap composite now stands at $31 a gross ton, compared with $31.17 a gross ton a week ago.

The avalanche of steel base price increases, extra revisions and higher freight rates, will force major steel consumers to in turn revise prices on their manufactured items. This action, however, may be painful in view of consumer resistance which has already developed in some lines. Manufacturers are also anxiously awaiting the result of steel wage negotiations since they in turn will face similar demands once steel wages have been advanced.

Railroad carbuilders are driving hard to get more steel during 1947 but it appears that they will get no more than the same percentage which they received in 1946. On a tonnage basis, however, this would mean a substantial boost if the industry was able to maintain uninterrupted output of steel. Practically all steel consumers face the prospect of finding deliveries much easier by next May or June should the industry be able to continue operations at around 90 pct of capacity.

While it is still too far in advance to make a reasonable prediction, the steel industry is still mindful of the fact that the coal situation with its problems has only been postponed. Unless some form of agreement is reached between the operators and the mine workers before Apr. 1, another coal strike is likely. In view of labor legislation, the probability of further decreases in food costs and the general public reaction, the steel industry and the coal mines may skin through the first quarter of this year without a major crisis.

• **NEW SEMI FINISH PRICES**—Effective Dec. 30, Carnegie-Illinois Steel Corp. raised the price of rerolling carbon quality blooms, billets and slabs $3 a ton to $42 a gross ton, f.o.b. basing point. Carbon forging quality, blooms, billets and slabs were increased $3 a ton to $50 a gross ton at basing point. Revised extras on both types of steel are expected immediately and will cover chemistry, size and cutting plus non-standard specifications. Carbon forging ingots were also hiked $2 a ton to $40 a gross ton at base point and new extras on size, annealing and chemistry will follow immediately.

• **TRACTOR PRODUCTION DOWN**—Although production of farm machinery as a whole dropped 8.3 pct in November from the October record high, harvesting, poultry and orchard equipment output showed a general increase, it is reported by CPA. Some decrease was noted in tractor production, the agency said, total output declining from 29.444 units in October to 26,822 in November. Exports of tractors rose from 18.9 pct of total production in October to 24.4 pct in November. Total manufacture of farm machinery was estimated at around $70 million in October as compared with $64.5 million in November. However, CPA said, much of the decrease reflected a shorted work week since the number of operating plants remained unchanged.

• **STEEL EXPORT LICENSES EASED**—Certain iron and steel products were removed from export licensing controls by the Office of International Trade, effective Jan. 2. Covered by the decontrol action are: Steel sheets, black, ungalvanized (including hot and cold rolled) containing no alloy: with 0.40 pct or more carbon content. Iron and steep strip (cold rolled) containing no alloy: with 0.40 pct or more carbon content. These products are under 0.40 pct carbon content remain subject to export control.

• **ORE SHIPMENTS**—Shipments of iron ore from the upper lake ports totaled 59,356,716 gross tons for the 1946 season, a decline of 16,358,034 tons from the 1945 season, according to the Lake Superior Iron Ore Assn.

• **APPRENTICE VOLUME UP**—An increase of nearly 3 pct in the number of apprentices employed by the building trades during the month of November is reported by the Labor Dept. Reports from more than 3600 firms showed over 87,400 listed, of which 13,400 were learning the electrical trade and 6200 in sheet metal work. Veterans constitute 90 pct of the total, it was added.

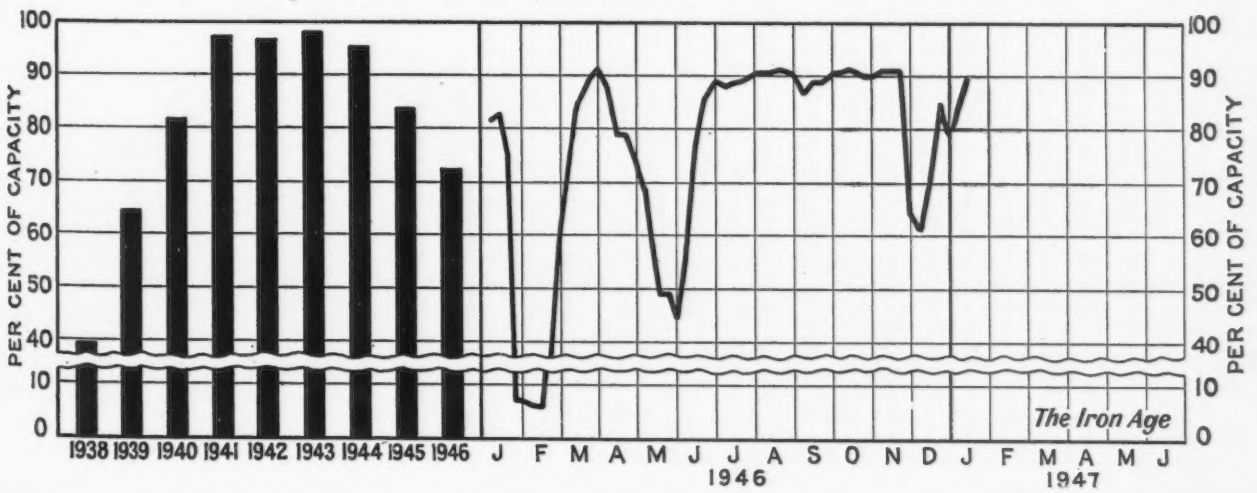
• **SAVINGS BOND BUYING**—Up to the present time total sales of series E Government Savings Bonds amount to $44,830,000,000. Redemptions total $14,480,000,000 leaving $30,349,000,000 of these bonds still outstanding, the Treasury Dept. reports.

• **EXPORT DATA**—Due mainly to the maritime strikes U. S. October exports of $529 million were 16 pct less than September shipments. A drop of $1.7 million in iron and steel semi-manufactures left October volume at $15.9 million. These included: Iron and steel scrap $100,000; steel ingots, etc., $4.8 million; plates, sheets, etc., $6.1 million; tinplate, etc., $3.5 million; ferromanganese and other ferroalloys, $200,000; aluminum, $600,000; and copper, brass and bronze, $600,000. Finished steel exports were $10.9 million; industrial machinery and equipment, $48.7 million; electrical machinery and equipment, $23.6, and agricultural machinery, $12.7 million.

• **GAS TURBINES**—With the bids now in, construction will begin in 1947 of the first two locomotive chassis in one of the foremost developmental programs of railroad technology—the revolutionary new gas turbine burning powdered coal. The turbo-power units are already on order from the Elliott Co. and the Allis-Chalmers Mfg. Co. An investment of $2 million for achieving the first two locomotive gas turbines is planned by the sponsor of this research program, the locomotive development committee of Bituminous Coal Research, Inc.

• **GEAR SALES DROP**—The gearing industry, as represented by the members of the American Gear Manufacturers Assn., shows a decrease in volume of sales for November 1946, as compared with October 1946, of 15.4 pct. This report does not include turbine or propulsion gearing. The index figure for November 1946, was 336.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
December 31...	97.0*	88.5	84.0	85.5	94.0	99.0	84.0	99.0	104.0*	72.0	92.0	80.0	85.0	86.5
January 7.....	100.0	90.0	88.0	88.5	99.0	102.0	97.0	99.0	102.5	81.0	94.0	81.0	87.0	90.5

* Revised.

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J&L STEEL

Percentage Freight Increases Shorten Radius of Steel Sales

Pittsburgh

By T. E. LLOYD
Pittsburgh Regional Editor

o o o

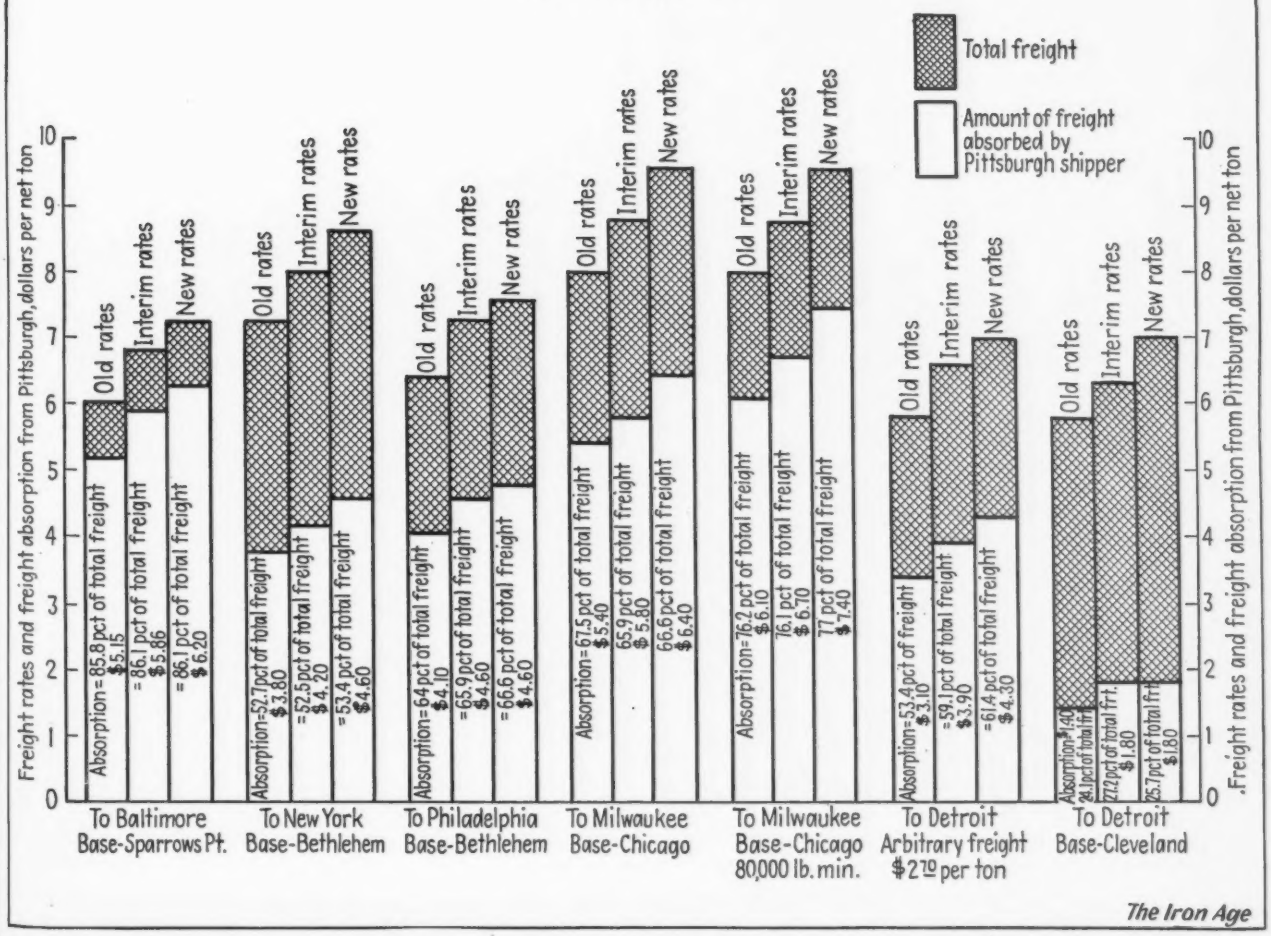
• • • **The Interstate Commerce** Commission seems to be effectively doing what the Dept. of Justice and various other government agencies have been wanting to do for many years. That is, forcing the steel industry pricing system to go to a f.o.b. mill basis instead of selling on the multiple basing point system now in effect.

With no particular premeditated intention of forcing such a move on the steel industry, the practice of granting rail rate increases on a percentage basis is gradually shortening the distance that a mill can ship before it hits the point of freight equalization and has to absorb freight charges for further material movement.

Table I shows the freight rates, converted to dollars per ton, on steel products from various basing points to various consuming points. Shown are the old rates, in effect when the war started; the interim rates, which became effective last July; and the new rates that went into effect on Jan. 1, 1947. The new rates are not taken from the official rate tariff, but are estimates made prior to its publication.

On the basis of the rate structure as shown in table I, the freight charges that must be absorbed by the Pittsburgh producer to reach various consuming points are shown in table II and in fig. 1. While other producing areas are similarly hit by the ICC rate structure, Pittsburgh is taken as an example. To reach the major consuming areas of New York and Philadelphia, Pittsburgh shippers must, under the new rate schedule, absorb $4.80 and $4.60, respectively, on each ton of steel shipped. Quite obviously, with mounting labor and

FREIGHT TO VARIOUS CONSUMING POINTS AND THE AMOUNT OF FREIGHT ABSORPTION FOR PITTBURGH PRODUCERS SHIPPING AGAINST THE BASING POINTS NAMED, DOLLARS PER TON


Total freight
Amount of freight absorbed by Pittsburgh shipper
Freight rates and freight absorption from Pittsburgh, dollars per net ton
Old rates
Interim rates
New rates
Absorption = 85.8 pct of total freight $5.15
= 86.1 pct of total freight $5.86
= 86.1 pct of total freight $6.20
Absorption=52.7 pct of total freight $3.80
= 52.5 pct of total freight $4.20
= 53.4 pct of total freight $4.60
Absorption=64 pct of total freight $4.10
=65.9 pct of total freight $4.60
= 66.6 pct of total freight $4.60
Absorption= 67.5 pct of total freight $5.40
65.9 pct of total freight $5.80
66.6 pct of total freight $6.40
Absorption= 76.2 pct of total freight $6.10
76.1 pct of total freight $6.70
77 pct of total freight $7.40
Absorption=53.4 pct of freight $3.10
=59.1 pct of total freight $3.90
=61.4 pct of total freight $4.30
Absorption=1.40
24.1 pct of total frt.
27.2 pct of total frt. $1.80
25.7 pct of total frt. $1.80
To Baltimore Base-Sparrows Pt.
To New York Base-Bethlehem
To Philadelphia Base-Bethlehem
To Milwaukee Base-Chicago
To Milwaukee Base-Chicago 80,000 lb. min.
To Detroit Arbitrary freight $2.79 per ton
To Detroit Base-Cleveland

The Iron Age

TABLE I

Freight Rates, Old, Interim and New, From Various Basing Points to Picked Consuming Points

$ Per Net Ton

	Pittsburgh			Sparrows Point			Bethlehem			Buffalo			Youngstown			Cleveland			Chicago		
	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New
Baltimore	6.00	6.80	7.20	.85	.94	1.00	4.20	4.60	5.00	6.80	7.60	8.20	6.60	7.40	8.00	7.20	8.00	8.60	9.40	10.60	11.20
New York	7.20	8.00	8.60	4.80	5.20	5.80	3.40	3.80	4.00	6.80	7.20	8.20	7.80	8.60	9.40	8.20	9.00	9.80	10.40	11.60	12.40
Philadelphia	6.40	7.20	7.60	3.40	3.80	4.00	2.30	2.60	2.80	6.80	7.60	8.20	7.00	7.80	8.40	7.80	8.60	9.40	10.00	11.20	12.00
Boston	8.80	9.80	10.60	7.20	8.00	8.60	6.20	7.00	7.40	7.40	8.20	8.80	8.80	9.80	10.60	8.80	9.80	10.60	11.00	12.20	13.00
Youngstown	2.45	2.80	3.00	6.60	7.40	8.00	7.00	7.80	8.40	4.60	5.00	5.60	.....	.....	.....	2.60	3.00	3.20	6.80	7.60	8.20
Cleveland	4.00	4.40	4.80	7.20	8.00	8.60	7.40	8.20	8.80	4.60	5.00	5.60	2.60	3.00	3.20	.....	.....	.....	6.20	7.00	7.40
Cincinnati	5.80	6.60	7.00	8.20	9.00	9.80	8.60	9.60	10.40	7.00	7.80	8.40	5.80	6.60	7.00	5.20	5.80	6.20	5.60	6.40	6.80
Detroit	5.80	6.60	7.00	8.40	9.40	10.00	8.40	9.40	10.00	5.20	5.80	6.20	5.00	5.60	6.00	4.40	4.80	5.20	5.60	6.40	6.80
Chicago	7.40	8.20	8.80	9.40	10.60	11.20	9.60	10.80	11.60	7.80	8.60	9.40	6.80	7.60	8.20	6.20	7.00	7.40	.....	.....	.....
St. Louis	8.60	9.60	10.40	10.40	11.60	12.40	10.80	12.00	12.80	9.00	10.00	10.80	8.40	9.40	10.00	8.00	8.80	9.60	4.80	5.20	5.80
Toledo	5.20	5.80	6.20	8.00	8.80	9.60	8.40	9.40	10.00	5.80	6.60	7.00	4.60	5.00	5.60	3.80	4.20	4.60	5.20	5.80	6.20
Milwaukee	8.00	8.80	9.60	10.00	11.20	12.00	10.00	11.20	12.00	7.80	8.60	9.40	7.40	8.20	8.80	6.80	7.60	8.20	2.60	3.00	3.20
San Francisco †	25.40	27.00	27.40	28.60	30.40	30.60	28.60	30.40	30.60	25.40	27.00	27.40	25.40	27.00	27.40	25.40	27.00	27.40	‡1.90	‡2.10	‡2.20
§	15.40	16.20	17.40	15.40	16.20	17.40	15.40	16.20	17.40	15.40	16.20	17.40	15.40	16.20	17.40	15.40	16.20	17.40	22.00	23.40	24.00
Baltimore*	4.00	4.40	4.80	.75	.84	.90	2.60	3.00	3.20	4.20	4.60	5.00	4.40	4.80	5.20	4.60	5.20	5.60	6.80	7.60	4.20
Philadelphia*	4.20	4.60	5.00	1.90	2.10	2.20	1.80	2.00	2.20	4.20	4.60	5.00	4.60	5.00	5.60	4.80	5.40	5.80	7.00	7.80	8.40
New York*	4.60	5.00	5.60	2.60	3.00	3.20	1.90	2.10	2.20	4.20	4.60	5.00	5.00	5.40	6.00	5.20	5.80	6.20	7.40	8.20	8.80
Boston*	4.60	5.00	5.60	3.40	3.80	4.00	3.40	3.80	4.00	4.20	4.60	5.00	5.00	5.40	6.00	5.20	5.80	6.20	7.40	8.20	8.80

† General Steel Products Rate. § Tinplate Rate. ‡ Minimum 80,000 lb. * For Export.

material costs, and finer profit margins, the natural tendency of the Pittsburgh producer would be to withdraw from these eastern markets completely, but total output cannot be sold locally.

Likewise, the same pattern is observed in going into the midwestern markets, where freight absorption for delivery into Chicago is $8.80 a ton, a rise from $7.40 a ton under the original or "old" ICC rates. To ship into Milwaukee, freight absorption for the Pittsburgh producers is $6.40 a ton, up $1.00 a ton from the original rates. On shipments of 80,000 lb or more, the freight absorption for a Pittsburgh shipper delivering in Milwaukee is $7.40 a ton, up $1.30 a ton from the old rate and up 70¢ a ton from the interim rate.

Arbitrary delivered prices make freight absorption for outlying mills far greater than the ICC rates would indicate. The sixth column in fig. 1 shows the freight absorption by the Pittsburgh mill on shipments into Detroit under the arbitrary delivered pricing system, while the seventh column shows absorption using Cleveland as a base. There have been no major advances in the freight factor in arbitrary delivered prices to Detroit since the system was inaugurated in 1933, but in the meantime freight rates have been advanced sharply. Consequently, freight absorption has increased from $3.10 under the old rate to $4.30 a ton under the new rate because the freight recovery has remained static at $2.70 a ton.

The latest increase, like the interim increase, was made on a percentage basis, boosting rail rates a certain percentage of the former rate. This action tends to increase the dollar and cents spread that must be absorbed by shippers when shipping toward another basing point, and thus reduces the distance that a mill can ship before it must start absorbing freight charges. This, in effect, tends to force a mill to find a market for its entire production within a shorter radius of the manufacturing point.

In the case of a producing center like Pittsburgh, the effects are far reaching, since Pittsburgh is primarily a metal producing area, and metal converter and fabricator consumption of steel is relatively low. Normally, the area should and would ship large tonnages into the heavy fabricating areas such as the eastern seaboard, Ohio, Michigan, Illinois and Indiana, but under the present rail rate system the freight absorption is reaching a point that such distribution of products is impossible as a profit. On the other hand, Chicago, Detroit, Cleveland, Sparrows Point, and Bethlehem producing centers can reach the great steel consuming areas without running into heavy freight absorptions.

Pittsburgh has been lax in the past in attempting to rectify the ill effects of rail rates on the city's steel industry. Holding the leading steel producing position for many years, no effort was made to see that the industry was protected against damaging effects of rail rate increases. In 1944, B. F. Fairless, president of U. S. Steel Corp., pointed out that 40 yr ago the freight disadvantage to Pittsburgh producers was $1.00 a net ton on shipments to New York as compared with similar shipments by eastern competitive mills. In 1944, the disadvantage had increased to $3.80 a net ton. Under the new rate system, the disadvantage to New York totals $4.60 a ton, and, as Mr. Fairless pointed out 3 yr ago, nothing has occurred in the interval to justify such an increase in the differential.

Another phase of the transportation cost picture that will have a major effect on the steel industry in general is the increase in ocean shipping rates. If the rates contemplated are put into effect, in the case of shipments of heavy steel in long lengths, the advantage of rail-ocean shipping to the Gulf and West Coast ports will be just about wiped out. Again the question of arbitrary delivered prices comes into the picture, and adjustment of these prices to the Gulf and West Coast ports to reflect increased transportation costs is practically a foregone conclusion.

At the instigation of the

TABLE II

Pittsburgh Freight Disadvantage at Various Consuming Points on Basis of Basing Points Closer to Destination; Increase in Differential from Old and Interim Rates

$ Per Net Ton

Basing Point Closer to Destination →	Sparrows Point			Bethlehem			Buffalo			Youngstown			Cleveland			Chicago			Arbitrary		
	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New	Old	Int.	New
Destination ↓																					
Baltimore	5.15	5.86	6.20	1.80	2.20	2.20															
New York	2.40	2.80	2.80	3.80	4.20	4.60															
Philadelphia	3.00	3.40	3.60	4.10	4.60	4.80															
Boston	1.60	1.80	2.00	2.60	2.80	3.20															
Youngstown										2.45	2.80	3.00									
Cleveland													4.00	4.40	4.80						
Cincinnati													.60	.80	.80	.20	.20	.20			
Detroit							.60	.60	.80	.80	1.00	1.00	1.40	1.80	1.80	.20	.20	.20	3.10	3.90	4.30
Chicago										.60	.60	.60	1.20	1.20	1.40	7.40	8.20	8.80			
St. Louis										.20	.20	.40	.80	.80	.80	2.40	2.60	3.00			
Toledo										.60	.80	.60	1.40	1.60	1.60						
Milwaukee							.20	.20	.20	.60	.60	.80	1.20	1.20	1.40	5.40	5.80	6.40			
																‡6.10	‡6.70	‡7.40			
San Francisco†																3.40	3.60	3.40			
Baltimore*	3.25	3.56	3.80	1.40	1.40	1.60															
Philadelphia*	2.30	2.50	2.80	2.40	2.60	2.80															
New York*	2.00	2.00	2.40	2.90	2.90	3.40	.40	.40	.60												
Boston*	1.20	1.20	1.60	1.20	1.20	1.60	.40	.40	.60												

* Shipments for Export. ‡ 80,000 lb. minimum. † Excluding Tinplate

Maritime Commission, the Interstate Commerce Commission has started an investigation of the (1) transcontinental rail rates, (2) the coastwise rail-ocean rates, and eventually (3) inland waterways rates. The rate structure of the first two items will be carefully examined with the idea in mind of maintaining a sufficient differential between transcontinental rail rates and the rail-ocean rates so as to make water shipping profitable and advantageous. Under ICC Docket Nos. 29663 and 29664, with a prehearing scheduled for Jan. 16, ICC will begin hearings.

Observers in the transportation field regard the investigations as one of the outstanding landmarks in the transportation charge picture. Many feel that the investigations will force transcontinental rail rates up considerably to reestablish a differential between rail-ocean and all rail shipments and the investigations may result in a minimum differential being set. It is regarded as fairly certain that the ocean rates will not be forced downward to reestablish such a differential.

England and U. S. Agree To Exchange German Technical Information

Washington

• • • **In a joint statement,** W. A. Harriman, Secretary of Commerce, and Sir Stafford Cripps, president of Great Britain's Board of Trade, announced an Anglo-American agreement for the exchange of German technical information acquired by the two nations since VE-Day.

Hundreds of thousands of important German scientific and technical documents have been uncovered by British and American investigators in their respective zones, and microfilm copies have been made. Heretofore the exchange of these documents between the two nations has been imperfect; but under the present agreement representatives of each nation will be able to select from the other's storehouse of reports the items which they find valuable. Copies will be obtained on an exchange basis.

The American depository for German documents and microfilms is the Office of Technical Services, Dept. of Commerce. Three British experts are now examining the catalogs and abstracts of these reports which have been prepared by OTS, and the Dept. of Commerce has agreed to provide microfilm copies of all items chosen by the screeners.

In London, the main processing center for German documents is the Board of Trade German Division (Documents Unit) which is located at Lansdowne House. There, documents of interest to industry are summarized and copies of the abstracts are sent to the OTS staff which is now at work in Frankfurt, Germany. Microfilm copies of all documents desired by OTS are being supplied by the Board of Trade.

In America, requests for British documents and summaries should be addressed to OTS, where the British material received is abstracted and publicized through the *Bibliography of Scientific and Industrial Reports.*

Form New Scrap Firm

Pittsburgh

• • • **Formation of the** Duquesne Iron & Steel Co., Inc., brokers in scrap and secondary metals, was announced effective Jan. 1. Gerald M. Frank has been elected president and E. Clyde Grimm has been elected vice-president. Offices of the new company are at 210 Grant St., Pittsburgh.

Both Mr. Frank and Mr. Grimm have been heretofore associated with M. B. Speer & Co., Pittsburgh.

Counter-Suit Entered Against AFL's Portal To Portal Pay Demand

Pittsburgh

• • • **With a week old "court plaster"** on it asking $3 million for portal-to-portal pay, the Pittsburgh Equitable Meter division of Rockwell Mfg. Co., uncorked a $15 million counter-suit against the AFL union officials. The counter-suit is for time lost at the company's Pittsburgh plant because of slow-down and the alleged refusal to maintain production. The issue basically is to determine what constitutes a work week.

Rockwell Mfg. Co.'s Pittsburgh Equitable Meter division, producers of valves and meters, charged that some of its employees, in spite of a written contract, have not worked an 8-hr day or a 40-hr week, but have expected compensation for full time employment. The $15,000,000 suit dates back to 1938 when the Wage and Hour law was enacted, the retroactivity feature coinciding with the demands of the AFL in its portal-to-portal suit.

The company suit named as defendants four persons. Meredith Powell, president of the Pittsburgh Federation of Meter Works, Local 88, affiliated with the United Auto Workers, AFL, was named. Mr. Powell is now an AFL international organizer. Also named were William Augustine, Pittsburgh, the local's recording secretary; Carl Smigel, Garfield Heights, Ohio, director of region 3 of the AFL international organization; and Frank Evans, Cleveland, a member of the staff of the international union.

The suit covers only the company's main plant in Pittsburgh, where 1700 persons are employed. Of the total employment, some 1100 are union members. None of the unions in the company's 12 other plants have yet filed portal-to-portal pay suits.

COUNTER CLAIMER: *In what may set a pattern for defense of portal to portal wage suits, Col. W. F. Rockwell, president, Rockwell Mfg. Co., Pittsburgh, is countering a $6 million "portal" claim with a $15 million suit charging the union with contract violations and unsatisfactory productivity.*

Tinplate Allocations Facing Difficulties, May Be Issued Soon

Washington

• • • **An inter-agency squabble** over continuation of the Government's tinplate export program through the first quarter of 1947 is expected to be settled within the next week. The final decision will probably be made by Presidential Adviser John R. Steelman.

While the case has not been presented to Mr. Steelman, CPA officials state that an impasse has been reached within that agency and outside mediation will be necessary.

One faction within CPA believes that the program should be junked immediately so that partial decontrol can be achieved before CPA's allocation and priorities power expires with the Second War Powers Act on March 31. However, this group would not interfere with shipment of the advance allotment of 55,000 tons which CPA authorized the office of International Trade to license last September.

Another CPA faction believes that the program should be continued through the first quarter and that the advance allotment should be supplemented by an additional 65,000 tons. This group feels that with most of this export tinplate being used for food packing the slack canning season in this country warrants continuation, particularly to countries below the equator. These countries are now in the midst of their heavy food packing season. The OIT and State Dept. support this latter position.

This situation would have been brought to a head many weeks ago had it not been for the advance allotment of 55,000 tons. OIT was authorized to license this tonnage for export to countries below the Equator to insure enough tinplate for the food packing season and to minimize the impact of tinplate orders of mill schedules. Should the program be continued this advance tonnage will be charged to the overall first quarter allocation.

CPA to Meet Steel Group

Washington

• • • **CPA will meet** with its Steel Products Industry Advisory Committee on Jan. 10 to discuss the steel needs for new freight cars, freight car repairs and other urgent steel requirements. The meeting is expected to be attended by top executives representing a cross section of the entire steel industry.

Approximately 7000 new freight cars will be required monthly in 1947 to meet minimum needs of the railroads, according to CPA estimates. With steel tight in virtually all types of products, particularly in sheet steel, the committee and government officials are expected to weigh the requirements of the freight car builders against consumers needs.

Machine Tool Wages Good

Boston

• • • **According to figures** just released by the Massachusetts department of labor and industries, average weekly earnings last November per wage earner in the highest paid classifications of manufacturing were:

Newspaper publishing, $61.83; shipbuilding, $55.82; machine tools, $51.27; machine shop products, $51.14; rubber products, $51.03; heating apparatus, $50.32.

Rising Costs Dictate Wide Steel Price Increases

New York

•••**Higher scrap costs,** increased prices for raw materials and freight rate advances on materials used by the steel industry, have forced most firms to raise steel prices much further and on a broader scale than had been anticipated a few months ago.

The original intent as deduced from statements made by steel heads was that only those items on which a low return or a loss was indicated would be adjusted upward in price. In the statements, however, the door was left open for general increases on the basis that if raw material costs and other factors were advanced, further steel price adjustments might have to be made.

On an average basis, heavy melting steel scrap has gone up an average of from $8 to $10 a ton within the past month. Since purchased scrap represents about one-fourth of the average furnace charge this increased cost on ingot production amounted to about $2 to $2.50 a ton. Figuring scrap loss on finished steel products which is returned to the openhearths as home scrap at about 30 pct, a net increase on finished steel production of from $1.40 to $1.75 a ton is indicated.

Recent price advances on finished steel products on a weighted basis, which takes into account the distribution of various products with respect to total shipments, shows an advance of $3.31 a ton in THE IRON AGE finished steel composite index over the past month. This increase only applies to base prices.

At the same time base price advances were being made, adjustments were being made on certain steel extras which meant higher net costs to steel consumers. Major extra changes affected flat-rolled products and hot-rolled bars. Additional extra revisions, however, are due on other products. While it is difficult to strike an average increase in extra charges, some steel sources place it at from $2 to $3 a ton after being distributed over most products.

A minimum estimate on the average net increase in steel prices over the past month is, according to some steel sources in the neighborhood of $5 to $5.50 a ton. The same steel sources insist that most of this increase over and above what the industry claims was necessary to boost the return on low-profit items is being used up by higher raw material prices, freight rate increases and other increased steelmaking costs.

By TOM CAMPBELL
News-Markets Editor

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It is possible, however, that when prices adjustments are finally completed by various steel companies, these firms may be in a position to make a conciliatory offer to the steel union and thus minimize the chances of a nationwide steel strike in February. This opinion which is shared by many in the steel business is predicated on the fact that the industry at any cost must be allowed to operate at a high rate of activity for some time to come if another serious setback in production is to be sidestepped.

One factor facing the steel industry and which is not commonly recognized is the substantially high level which the industry must operate in order to break even. Before recent price advances were made the general theory in the trade was that the breakeven point was around 70 to 72 pct of capacity. Reliable sources indicate that the breakeven point at that time was much closer to 80 pct than to 70 pct. Many believe that an increase in steel wages without some kind of a compensation in steel price quotations would have caused the breakeven point to rise to an untenable figure.

If Philip Murray wrings a sizeable wage increase from the steel industry, as he is likely to do, price advances already made may serve to cushion at least to a slight extent

Going up!

increased wage costs and make unnecessary the installation of an overpriced condition in steel products after the wage negotiations.

Tax Revision, Labor Laws Get Attention Of the New Congress

Washington

• • • **As the 80th Congress** organized, immediate attention was turned toward labor and tax legislation, making it certain that these would receive preference in major legislative matters.

Proceeding cautiously, the Senate GOP conference has approved immediate introduction of a revised version of the Case Bill under the sponsorship of Senators Taft (R.-Ohio), Ball (R.-Minn.) and Smith (R.-N.J.). Although approved by the conference, no member is bound to support the bill in its entirety.

Major points covered by the bill include the outlawing of secondary boycotts, banning of the jurisdictional strike, and the exemption of foremen, inspectors, safety bosses and guards from unionization. Revision of the Wagner Act and banning of the closed shop are to be covered in separate legislation.

On the House side, however, two score bills affecting various phases of labor were immediately dropped into the hopper. Five identical measures would ban strikes in any industry affecting public health and safety. Rep. Smith (D.-Va.) offered a comprehensive bill virtually rewriting the Wagner Act.

Rep. Knutson (R.-Minn.) introduced a tax-trimming bill (HR-1) proposing a 20-pct cut in income taxes up to $300,000 and 10.5 pct of the portion above that amount; increased exemptions would be allowed those above 65. Other measures offered opening day included: Suspension of the closed shop in regard to veterans (HR-5); creation of a tax commission to determine rates and policies (HR-13), several measures providing cash payment of GI terminal leave, several abolishing the poll tax, and several with respect to admission of aliens including one by Rep. Celler (R.-N.Y.) permitting entry of 250,000 displaced persons.

1946 Domestic Tin Use Declines; Imports Increase 6500 Tons to October

Washington

• • • **Tin consumption** in the United States during the first 9 months of 1946 amounted to 59,005 long tons compared with 66,564 during the same period in 1945, according to a CPA report recently made available.

This indicates a total of about 81,000 tons for the entire year of 1946 as compared with 84,535 tons during 1945. Work stoppages in the steel and automobile industries together with cancellation of war contracts accounted for a large part of the decline.

Imports for the 9-month period amounted to 38,512 tons compared with 32,022 tons during the same period in 1945. However, supplies from domestic secondary sources declined by 2613 tons, partially offsetting the gain in imports. In addition to the above mentioned imports, 5316 tons of pig tin from Japanese stocks had arrived in the United States by the end of September for weighing, sorting and analysis and for final disposition by the Combined Tin Committee. There was also considerable tonnage still en route.

Stocks declined during the 9-month period by 5293 tons. Almost all of this decline was in the form of tin concentrates at the government-owned smelter. Since a large part of the stocks of concentrate shown in the accompanying table are working stocks, including in process and blending stocks, the decline has resulted in substantially lower smelter production during the fourth quarter of last year.

Figures covering the first three quarters of 1946 are shown on the accompanying tables.

United States Tin Stocks During 1946[1]
(long tons of tin content)

	Government Stocks			Private Stocks			Total
	Concentrate	Pig Tin[2]	Total	Pig Tin	Other[3]	Total	
Jan. 1	32,538	35,490	68,026	14,951	8,646	23,597	91,623
Apr. 1	34,319	37,520	71,839	14,059	8,567	22,626	94,465
July 1	29,885	37,150	67,035	15,484	8,592	24,078	91,111
Oct. 1	27,278	35,354	62,632	14,740	8,958	23,698	86,330

[1] Source: Tin, Lead and Zinc Branch, CPA.
[2] Includes 12.140 tons of Treasury and Navy reserve stocks not available for allocation but excludes 5316 tons of tin from Japan brought here for weighing, sorting, and analysis and final disposition by the Combined Tin Committee.
[3] Includes small amounts of bar tin, anodes, powder, recoverable tin in alloy scrap, and tin in process at consuming plants.

Consumption of Tin and Tin in Alloys, 1946[1]
(long tons)

	1st Quarter	2nd Quarter	3rd Quarter
Tin and tinplate	4,641	7,427	7,736
Brass and bronze	5,262	5,646	5,350
Solder	3,514	4,170	4,666
Babbitt	1,596	1,663	1,743
Tinning	471	558	554
Collapsible tubes	181	186	278
Foil	53	58	63
Type me al	318	290	358
Chemicals	27	31	32
Pipe and tubing	56	84	91
Unclassified [2]	576	779	547
Total	16,695	20,892	21,418

[1] Source: Tin, Lead & Zinc Branch, CPA.
[2] Includes exports and re-exports of pig tin.

Pig Tin Supplies, Consumption and Stocks, 1946

	1st Quarter	2nd Quarter	3rd Quarter
Opening stocks			
Government [1]	23,350	25,380	25,010
Private	14,951	14,059	15,484
	38,301	39,439	40,494
Domestic production	12,068	12,318	11,527
Imports	17	4,263	2,286
	12,085	16,581	13,813
Consumption and exports	10,947	15,526	16,353
Closing stocks			
Government [1]	25,380	25,010	23,214
Private	14,059	15,484	14,740
	39,439	40,494	37,954

[1] Excludes Treasury Procurement and Navy reserve stocks.

New Supply of Secondary Tin, 1946
(long tons)

	1st Quarter	2nd Quarter	3rd Quarter
Production of secondary pig [1]	512	648	654
Recoverable tin in receipts of alloy scrap [2]	5,462	5,340	5,245

[1] Source: Bureau of Mines.
[2] Source: Tin, Lead and Zinc Branch, CPA.

Imports of Tin Into the United States, 1946[1]
(long tons)

	1st Quarter	2nd Quarter	3rd Quarter
Concentrates [2]			
Belgian Congo	2,803	2,241	2,170
Bolivia	10,899	6,106	6,895
French Cameroons	37	21	0
Netherlands Indies	0	424	331
Other	4	0	15
Total	13,743	8,792	9,411
Metal [3]			
Belgian Congo	0	0	628
Netherlands Indies	17	292	1,410
United Kingdom	0	3,947	248
Other	0	24	0
Total	17	4,263	2,286
Total Imports	13,760	13,055	11,697

[1] Source: Dept. of Commerce.
[2] The above figures of imports of concentrate are on a tin content basis. The amount of this actually recoverable as refined tin will be less due to treatment and smelting losses.
[3] Excludes 5316 tons of tin from Japan here for weighing, sorting and analysis and for final disposition by the Combined Tin Committee.

Surplus Sale Includes Steel Bar Rolling Mill

Washington

• • • **A steel bar** rolling mill and an ordnance plant are included in surplus government plants which have been offered for sale by War Assets Administration.

Operated by Allegheny Ludlum Steel Corp. during the war, the rolling mill is located at Dunkirk, N. Y. It cost the government $4,638,000 and has a rated capacity of 18,000 tons of alloy bar and wire annually. It has heating and annealing furnaces, merchant pig and bar mills, grinders, lathes, drawing and other equipment.

Bids are invited for the plant in its entirety for the land and buildings, or for the machinery only for removal from the site. Bids will be opened Mar. 3.

The Des Moines (Iowa) Ordnance plant, used to make small arms ammunition, is offered for sale or lease, in whole or in part. It is suited for conversion to production of agriculture machinery, engines or plane parts, metalworking, machine shop and other similar purposes, WAA said. Proposals must be received before 3 p.m. on Feb. 18.

Axis Communication Restrictions Relaxed

Washington

• • • **Relaxing of wartime** restrictions to permit free exchange of business and commercial communications of informational nature with Germany and Japan has been announced by the State Dept. Transactional communications are still banned.

Permitted are inquiries or reports concerning status of property located within Germany or Japan and information or other messages in respect to resumption of business relations or other trade prospects. Documents such as birth, death and marriage certificates, wills, legal notices, etc., are allowed to be transmitted.

Still forbidden are instructions or authorizations to effect financial or other business transactions and the transmission of proxies, checks and other currency orders, payment orders and the like. These must be effected through regular government channels.

Nathan Associates To Make Full Report On Iron and Steel Industry

Washington

• • • **A comprehensive report** on the iron and steel industry is now being prepared by Robert R. Nathan Associates, Inc. Similar to the overall report prepared for the CIO and released recently, Mr. Nathan's study is the fifth analysis of steel industry operations now underway. The others are being prepared by the Dept. of Commerce, Federal Trade Commission, Civilan Production Administration, and the research staff of the United Steelworkers of America.

Mr. Nathan's report will be supplementary to the data being gathered by the steel union to be used in wage negotiations with the industry.

Mr. Nathan told THE IRON AGE that material was still being tabulated and that the report should be available in about 10 days and will be more intensive than the overall report since it will be linked to wage demands in a specific industry.

He said it would cover financial and operating data of the industry with as much material as is available on fourth quarter operations incorporated in the study. However, much of the fourth quarter material is preliminary and an analyses of this period will consist largely of projections based on operations for the first 9 months of 1946. Included will be profit data, the relationship of costs to operating rates and other material pertinent to the steel wage demands.

While the governmental studies differ in some respects and are being made for different purposes than the Nathan and CIO reports, they parallel each other in that the industry's capacity or alleged lack of adequate capacity comes in for the lion's share of attention in all three instances.

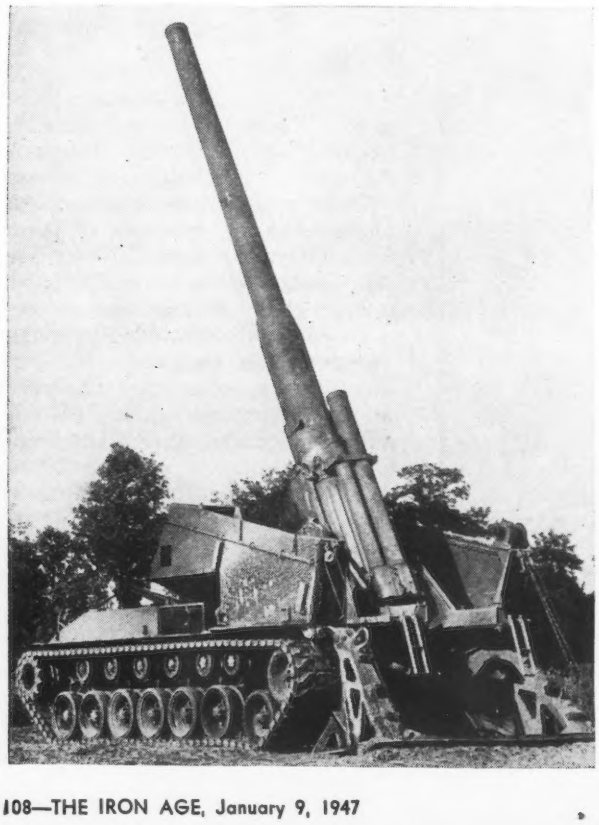
In addition, the FTC is studying the expansion of the steel, automobile and other large industry and changes that may have occurred in production and distribution as a result of this expansion.

The CPA study is concerned primarily with capacity. CPA economists have extended the trend of steel production from 1901 to date and extended the trend of steel production per capita for the same period. After relating steel production to the Federal Reserve index of production and to the gross national product, CPA came up with preliminary estimates which showed a need for steel ingot production of from 90 to 100 million tons by 1950. Compared with other studies this survey in one respect is on the conservative side. Already ingot capacity exceeds the 90 million figure. On the other hand, prospects of a jump to 100 million tons in three years are looked upon by the industry as being altogether improbable.

The study being conducted by the Machinery and Metals Division of the Dept. of Commerce was first disclosed on Oct. 3 by THE IRON AGE, p. 64.

The steel industry insists that its difficulty is not lack of capacity but loss of production in 1946 by steel and coal strikes, estimated at about 16,000,000 tons. This tonnage, it has been pointed out, interestingly enough just about equals backlog demand that was concentrated on the mills after VJ-Day. The heaviest demands are for sheet and strip steel, whose capacity will be increased about 2,500,000 in 1947. Present annual ingot capacity is rated at 91,890,560 tons.

Chairman R. S. Olds of the United States Steel Corp., said at a recent press conference in New York that once the pent up demand for steel is satisfied and once inventories are filled up in the hands of consumers, "we feel quite certain there is going to be a marked let-down in the demand for steel." Mr. Olds added that he was in no position to say when that is going to arrive but that it might be some time next year. He emphasized, however, that the present heavy demand for steel cannot be safely relied upon "as being at all of a permanent character."



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HOW LONG?
Labeled by some as a big gun of the future is this 8-in. rifle capable of hurling a 240-lb shell for 27 miles. It is mounted on a 63-ton carrier designed and developed by Chrysler and Army Ordnance. How long it will take for rockets to outmode it is still a matter of question.

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Hastens Airport Disposal

Washington

• • • **Orders have** been issued to the field by Robert M. Littlejohn, WAA Administrator, that all surplus airports and building machinery, supplies and installations must be cleared for disposal by Apr. 30.

Declaring that the WAA must meet the previous target date of Jan. 31 for the disposal of 75 pct of surplus stock in inventory as of Nov. 1, 1946, field offices were instructed that after Feb. 1, all items declared surplus must go on sale within 60 days after declaration.

These instructions are part of a general program, Mr. Littlejohn said, by which surplus sales will be pushed during the months of February, March and April.

Weekly Gallup Polls . . .

Majority Favor Leaving Armed Forces Untouched

Princeton, N. J.

• • • **Republican proposals** to slash government spending and cut taxes inevitably raise the question whether the public is willing to see the Army and Navy reduced according to George Gallup, director, American Institute of Public Opinion.

The armed forces account for the biggest single item of government expense—about half of the total budget.

A study of public sentiment recently completed by more than 200 interviewers for the institute from coast to coast shows that there is no substantial public pressure at present for reducing the armed forces.

In fact, when presented with the choice of cutting down the Army and Navy, or cutting down taxes, the great majority say they would rather see taxes left unchanged to avoid reducing our armed power.

The issue was put to a true cross-section of voters as follows:

"About half the cost of our government today goes to support the Army and Navy. Which of these do you think should be done? (1) Reduce taxes by cutting down our Army and Navy. (2) Keep our Army and Navy as they are for another 2 or 3 yr."

The vote:

	Pct
Reduce taxes by cutting armed forces..	20
Keep Army and Navy as they are.....	70
No opinion	10

The issue of our expenditures for military purposes was raised in direct fashion last autumn by Henry A. Wallace in a letter to President Truman. Mr. Wallace expressed fears that we were embarked on a new armaments race.

According to recent press reports, a cut of some $5 billion in the armed forces' 1948 budget requests seems likely.

Views on arms budget cuts are remarkably uniform in all groups. the poll shows. Democratic and Republican voters are in substantial agreement. Veterans of World War II differ somewhat from the rest of the country, a larger proportion of them being in favor of keeping the armed forces at present strength.

The vote by groups:

	Reduce taxes Pct	Keep Army same Pct	No opinion Pct
Veterans	19	75	6
By Party			
Democrats	19	71	10
Republicans	20	71	9
By Education			
College	19	76	5
High School	20	74	6
Grade School or no school	21	66	13

•

• • • **Harold E. Stassen** has defied political tradition by announcing himself a candidate for the presidency 18 months before nominating convention time.

Stassen's many followers will be interested in an impartial appraisal of his strength and weakness, as of today, among various groups in the rank and file of the Republican party. This appraisal is based on surveys conducted by the institute recently.

(1)—For at least 19 months Stassen has consistently been in a strong second position next to Governor Dewey in respect to the number of Republican voters who say they would like to see him nominated in 1948. At one time, in May of this year, Stassen and Dewey were running neck and neck in the institute's candidate popularity polls among GOP voters. Later Dewey moved back into the lead and this lead was increased after the Nov. 5 elections when Dewey was reelected governor of New York by a big majority.

Many political observers believe that second place in popularity is a good position to have at this distance from the nominating conventions. For one thing it helps avoid possible "stop - Stassen" movements.

(2)—One of Stassen's big problems as an avowed candidate is getting himself and his name better known among the general public.

When a cross-section of voters of all parties was asked, "Can you tell me who Harold E. Stassen is

Strength and Weaknesses Of Stassen as Candidate Analyzed In Political Nationwide Poll

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or what he does?" approximately one third of all those questioned were able to identify him correctly, whereas the other half either made an incorrect identification or said they simply did not know who he is.

Since Stassen is not in Congress or running a state government he has no official sounding board. Some political observers believe that his move in announcing his candidacy and setting up headquarters in Washington was therefore well-advised, to give increased weight and importance to his activities.

(3)—Stassen runs Dewey a strong second among the independent voters of the country—the people who do not regard themselves as either regular Republicans or regular Democrats.

In the last two presidential elections these independent voters have held the balance of power. If 1948 shapes up as a very close election, Stassen's strength with independent voters would be a strong factor in his favor.

(4)—In terms of popularity, Stassen's two best sections are the West Central states, which include his home territory of Minnesota, and the Pacific Coast states. He is weakest in the Middle Atlantic and East Central sections, the former containing Dewey's home state of New York. The East Central section contains Ohio, home of two possible contenders, Senator-elect Bricker and Senator Taft, and Michigan, home of Senator Vandenberg.

(5)—Stassen is at the moment stronger than any other candidate except Dewey with veterans of World War II. Stassen is himself a Navy veteran.

However, if an active campaign is begun in the Republican party on behalf of Gen. Dwight Eisen-

(CONTINUED ON PAGE 150)

Predicts Ship Scrapping Will Reach 80,000 Tons Per Month

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By GENE HARDY
Washington Bureau

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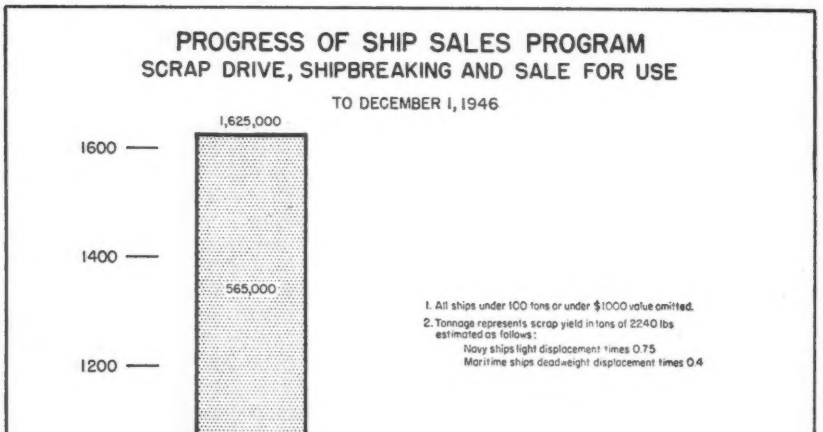


PROGRESS OF SHIP SALES PROGRAM

Measured in gross tons of ship scrap

	Aug. 1, 1946	*Dec. 1, 1946*	*Increase Aug. 1 to Dec. 1*
Total Navy and Maritime Commission.	1,275,000	1,625,000	350,000
Sold	462,000	1,060,000	598,000
To be sold	813,000	565,000	—248,000
Total Navy	521,000	825,000	304,000
Sold	119,000	500,000	381,000
To be sold	402,000	325,000	— 77,000
Total Maritime	754,000	800,000	46,000
Sold	343,000	560,000	217,000
To be sold	411,000	240,000	—171,000

Washington

• • • **An estimated capacity** of 80,000 tons a month in the shipbreaking industry sometime this year and an increase in the number of firms engaged in ship scrapping are the major predictions of a year-end progress report on the shipbreaking program prepared by CPA.

Centering on the work of the Shipbreaking Task Committee, headed by Capt. H. A. Ingram, USN, who has since returned to active Navy duty, the report highlights some of the delays encountered in getting the program under way.

While the Task Committee has been successful in getting 22 shipyards declared surplus for leasing to qualified shipbreakers, "progress in leasing the surplus shipyards has not as yet proved as successful as had been anticipated," according to the report.

Continuing, the report points out that "this is the only phase of the entire shipbreaking program which has not met the objectives of the Task Committee. Delays have occurred which took the form of long drawn-out processes in declaring the yards surplus, time consumed in making inventory of property in the yards, and arrangements for leasing between WAA and prospective shipbreakers."

However, CPA states that those yards which were ultimately placed in operation have justified the ear-marking of these facilities for shipbreaking purposes. It is expected that a considerable tonnage of ship scrap will be produced in these facilities this year.

When the scrap drive began on July 15, 1946, there were nine established operators in the shipbreaking business. Their activities were chiefly concentrated in the Chesapeake Bay - Delaware River areas. There were a few companies operating on the West Coast but their activities were limited by the inability to obtain shipbreaking facilities. It is estimated by CPA that prior to the

start of the program, output of ship scrap amounted to about 15,000 tons monthly.

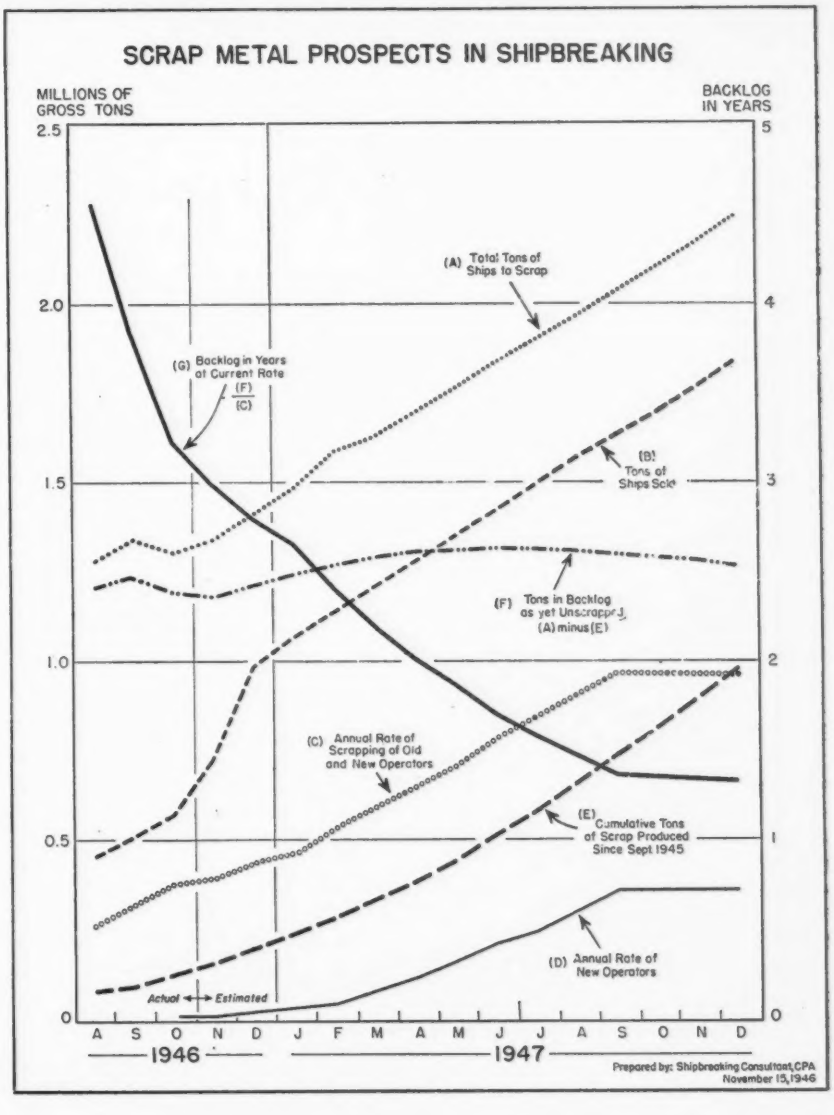
Between Aug. 1 and Dec. 1, 1946, the number of shipbreakers had increased from 9 to 24, states the report. Several companies installed entirely new facilities with their own funds. Other concerns obtained the use of waterfront property without bidding for the lease of surplus government facilities. In addition to the 24 operators engaged in breaking ships on Dec. 1, there were 13 other concerns who were actively interested in going into ship scrapping. A few of this latter group had purchased surplus vessels but had not yet obtained shipbreaking facilities.

As the industry expanded, CPA reports that the output of ship scrap increased. From a level of 15,000 tons a month before the program began, production increased to a rate of 36,000 tons a month by December. When all facilities are completed, it is estimated that the capacity of the industry to break ships will total 80,000 tons a month, 50,000 tons from the expansion of established shipbreakers and 30,000 tons from new operators.

In the period from VJ-Day to Aug. 1, 1946, which is the start of the shipbreaking program, 1,275,000 tons of ships were offered for sale, mostly on a scrap tonnage basis. Progress on the part of the Navy Dept., and the Maritime Commission in offering ships for sale to fulfill the needs of this program, is indicated in the table on page 110.

The tonnage of ships to be sold on Dec. 1, 1946, amounting to 565,000 tons, represents the total available supply of vessels declared surplus, or under survey with a view to future sale. A number of these vessels are located outside of the United States and will be returned to this country under the provisions of the lend-lease act. Other ships are now under consideration for sale but legal provisions with respect to the disposal of surplus vessels must first be complied with before they are offered for sale.

One primary objective of the shipbreaking program at this time is to obtain a constant flow of ships for sale to keep existing and new operators working at capacity. At present, CPA reports that the shipbreaking industry has a considerable backlog of ships to scrap, and it is necessary that this backlog be maintained to assure smooth operations.



Chemical Group Elects C. A. Thomas President

St. Louis

• • • **Approximately** 50,000 members of the American Chemical Society took part in nationwide balloting which resulted in the election of Dr. Charles Allen Thomas for a 1-yr term as president beginning Jan. 1, 1948. Dr. Thomas is a vice-president and technical director of Monsanto Chemical Co. and one of the key figures in the development of atomic energy. Dr. Thomas will serve as president-elect for one year and as president for the ensuing year.

During World War II, Dr. Thomas was one of the principal scientists in the development of the atomic bomb, having had charge of final purification and metallurgy of plutonium, the 94th element. Aside from the important work Dr. Thomas has done in atomic energy he also had the leading role in the development of catapult rockets in the American conception of German robombs.

USES Records Employment in 1946 Highest in History

Cleveland

• • • **During 1946 the** number of workers employed on peacetime jobs rose to the highest levels in the nation's history, according to J. Kimball Johnson, director of the U. S. Employment Service for the Ohio, Michigan and Kentucky region.

"Employers in this region, moreover, indicate that further employment increases during early 1947 are required to meet their production schedules," he added.

Most of the millions of workers released from the armed forces who were not returning to school secured jobs, and this development, along with increasing employment, completely overshadowed all others during 1946 from the viewpoint of USES.

"While figures for all of 1946 are not yet available, Census Bureau estimates for the first 10 months alone show the number of workers gainfully employed increased from less than 51,500,000 to more than 57,000,000, a net gain of 5,500,000," Mr. Johnson pointed out.

"Although most of this increase consisted of male workers, the number of employed female workers increased by nearly a million during this period despite a net reduction of nearly 4,000,000 in the armed forces and despite the fact that thousands of others released in 1945 did not secure jobs until 1946."

He admitted that many veterans are still unemployed, as indicated by the nearly 900,000 GI continued unemployment claims in mid-November, and predicted that a much larger number will be looking for jobs as soon as they have completed their education.

"The majority of these veterans are living in areas where job opportunities are relatively scarce, while sufficient housing facilities are not available in those areas where so many of them could get jobs."

Mr. Johnson added that toward the end of October, employment in the country as a whole decreased slightly due to seasonal influences, primarily agricultural.

In Ohio, Michigan and Kentucky region, the number of workers employed by 3673 plants included in the survey conducted by local USES offices rose from 1,980,000 in January to 2,372,000 for November, for a net gain of 392,000. The increase in employment of veterans alone by these plants amounted to nearly 300,000.

Employment in the surveyed plants engaged in manufacturing amounted to 1,824,000 in November, an increase of 332,000 since Jan. 1, 1945. During the same period, 33 iron and steel plants expanded their employment by 17 pct. In sharp contrast to these increases, total November employment in 80 machine tool plants in the region remained near January levels.

Despite the rise in the volume of employment, the number of unemployed throughout the region as of mid-November was estimated to be between 210,000 and 250,000.

"The return of millions of veterans to their former jobs meant, of course, that a large share of the nonveteran workers who had been filling these jobs temporarily had to find employment elsewhere, and this continuous process of job changes involving thousands of workers was reflected in the activities of USES," Mr. Johnson reported.

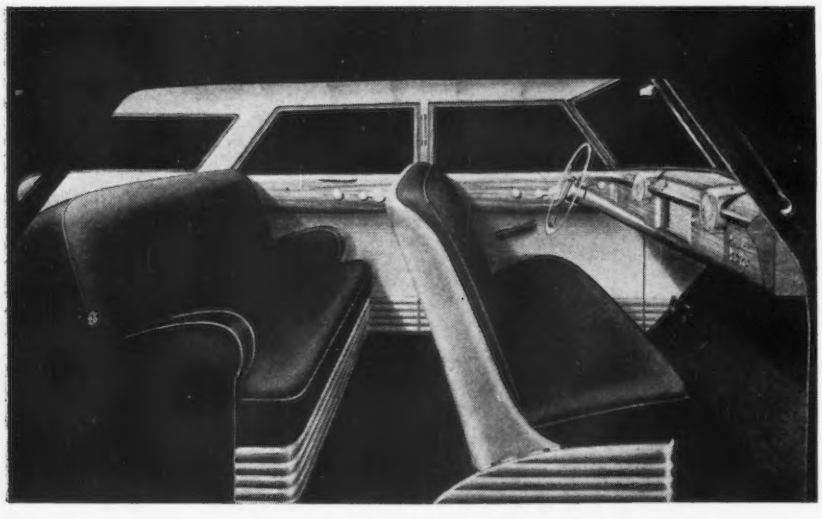
"These offices referred more than 1,130,000 workers to local job openings from January through November, and as a result of these referrals, over 485,000 jobs were filled. Nearly 9500 of the jobs were filled by workers recruited by or through USES offices in other areas, mostly from other states, mainly because enough workers with the necessary qualifications were not available in the areas where they were needed."

Over 500,000 of the referrals and 200,000 of the placements were veterans; 50,000 referrals of handicapped veterans resulted in the filling of over 18,000 jobs.

Employment developments during 1947, according to Mr. Johnson, will include extension of current high employment levels. The forecast of labor needs of the 3673 employers in this region, based on their own anticipated production schedules as of November, gives no indication of any drop in employment during the immediate future, at least until March, the end of the forecast period.

"On the contrary, these employers say their production schedules as of November call for hiring 47,300 additional workers by January, representing a net increase of about 3.5 pct above November levels. Similarly, by March a net employment

THIS PLASTIC AGE: *Briggs' engineers visualize motor car interiors of the future as utilizing plastics for the following applications: Plastic head-lining, synthetic seat cushions and floor mat, decorative plastic panels, window garnish moldings and instrument panel, and plastic steering wheel, knobs and escutcheons.*



increase of 4.5 pct above November levels will be required."

Mr. Johnson said that it was quite possible that these net gains will not be fully realized by the indicated months because of shortages of critical materials and certain types of skilled workers.

"In fact, this seems quite probable since total employment in these same plants went up only slightly from September to November, even though their September forecast production schedules called for hiring a large number of additional workers during that 2-month period," he added.

Obviously, other developments not readily discernible at this time may also force a revision of these employers' forecast schedules.

Mr. Johnson also predicted that large numbers of workers will continue to change jobs as long as employment remains at its current high levels and plenty of jobs are available. This situation, he said, will to some extent remain accentuated because of the veterans who still have re-employment rights to their old jobs.

During 1946, the rate of labor turnover while well below wartime levels, was still about twice as high as the 1939 average. The 1947 turnover rate will probably be somewhat lower than the 1946 average.

Need for more employment counseling and for more occupational information about job opportunities will continue, according to Mr. Johnson. Changes in methods of production and job opportunities during the last few years, together with the difficulties so many workers have in adjusting "employment-wise" reveals a glaring need for such services.

He said that while employment counseling services have been expanded during recent years and more information is being assembled on job opportunities in specific occupations, the expansion in these fields of service has not been nearly enough to meet the growing needs.

Up to the end of November, local USES offices in this region conducted over 113,000 counseling interviews which included personal consultation with each applicant.

Tool Steel Producers Will Protest Tariff Concessions

New York

• • • The majority of the producers of tool and fine steels, dumbfounded over news of proposed tariff concessions on these products, has prepared a brief of protest which the industry's tariff committee proposes to amplify at hearings scheduled to begin in Washington on Jan. 13. The committee's brief holds that possible tariff concessions to foreign producers of tool and fine steels is a threat to American manufacturers of these products.

Reciprocal trade agreements are about to be negotiated with the United Kingdom, France, Belgium, Netherlands, Norway, Czechoslovakia, Canada and other countries. Sweden, Germany and Switzerland, however, are not included in the list of countries with which negotiations are being carried on at the present moment. During the decade preceeding World War II, Sweden and Germany were this industry's principal foreign competitors.

"It appears" says the brief, "that concessions are now to be considered with other than the principal foreign competing country and then these concessions are to be extended without any equivalent concession from our principal competitors."

"In other words, when the principle of reciprocity is under discussion, all negotiations must be carried on with the principal foreign suppliers of competitive imports—particularly if concessions granted are to be given application under the 'unconditional most favored nation' treatment. We feel that we are duty bound to call attention to this apparent departure from sound foreign trade policies and we desire to protest most vigorously against the inclusion of any of the products of the tool and fine steel industry in the granting of any concessions to the group of countries with which negotiations are at the present time in progress."

The tariff committee pointed to the relative importance of the tool and fine steel industry despite its small size and volume compared to the American steel industry as a whole. It added that its products were strategic and critical and an essential part of the nation's business.

"In passing," continued the brief, "it should be noted that while our principal competitors during the decade preceding World War II were Sweden and Germany, tool and fine steels were manufactured in considerable volume in Austria and Czechoslovakia as well as in Belgium and France and also in the United Kingdom and Canada. In this connection, very considerable concessions were granted in trade agreements negotiated with Sweden, the United Kingdom and Canada before the outbreak of World War II. "Under the recent extension of the Trade Agreements Act, however, it is now possible to make another series of 50-pct concessions in the case of all items upon which concessions have already been granted in earlier agreements. It would seem that the intelligent method of procedure would be to permit a few years time to elapse so that all parties of interest—government, industry and labor—might see the repercussions resulting from past effective downward tariff revisions."

The tariff committee of the tool and fine steel industry consists of A. T. Galbraith, vice-president, Crucible Steel Co. of America, Roy C. McKenna, chairman of the board, Vanadium-Alloys Steel Co., and J. Heber Parker, president, Carpenter Steel Co.

Other steel companies represented in the brief, in addition to those listed above are:

Braeburn Alloy Steel Corp., Columbia Tool Steel Co., Henry Disston & Sons, Inc., Firth-Sterling Steel Co., Jessop Steel Co., Ingersoll Steel & Disc Co., Latrobe Electric Steel Co., Allegheny Ludlum Steel Co., Midvale Co., Simonds Saw & Steel Co., Universal-Cyclops Steel Co. and Vulcan Crucible Steel Co.

Iron and Steel Group Elects L. R. Milburn President for 1947

Pittsburgh

• • • **L. R. Milburn**, electrical engineer, Great Lakes Steel Corp., Ecorse, Mich., has been elected president of the Assn. of Iron & Steel Engineers for the year 1947.

L. R. Milburn

As president of the AISE for 1947, Mr. Milburn will help the association celebrate its 40th yr of service to the nation's iron and steel industry. Founded in 1907 as a means of fostering the exchange of ideas and furthering the electrification of the iron and steel industry, the association has amplified the scope of its activities, now embracing all the various divisions of steel plant engineering and operation. Engineering divisions now functioning within the association include the electrical, mechanical, fuel and power, lubrication, welding, operating practice and rolling mill fields.

A. J. Fisher, fuel engineer, Bethlehem Steel Co., Sparrows Point, Md., was elected first vice-president; C. H. Williams, chief engineer, Pittsburgh district, Carnegie-Illinois Steel Corp., was elected second vice-president; A. S. Glossbrenner, assistant vice-president in charge of operations, Youngstown Sheet & Tube Co., was elected treasurer; and John F. Black, assistant works manager, Atlas Steels, Ltd., Welland, Ontario, Canada, was elected secretary.

R. E. Baker Resigns From Arthur McKee Co. After 40-Yr Service

Cleveland

• • • **R. E. Baker**, secretary and treasurer of Arthur G. McKee & Co., resigned Jan. 1, 1947, after 40 yr of continuous service with the company and its predecessors. Mr. Baker has been a director, secretary and treasurer of the company since its incorporation, first as a Pennsylvania corporation in 1915 and later, in 1920, as a Delaware corporation.

Mr. Baker became a partner of Mr. McKee shortly after the latter opened an engineering office in Cleveland in 1905 and has been one of the principals in building the business of the McKee company from a consulting engineering business in the iron and steel industry to one of the leading engineering and contracting companies in the iron and steel and petroleum refining industries in the United States and foreign countries.

Mr. Baker will continue to participate in the affairs of the company as a director and as a member of the advisory committee of the board of directors.

Directors of McKee & Co. elected two officers to fill the vacancies created by Mr. Baker's resignation. H. R. Moorhouse was elected secretary and James Krumhansl was elected treasurer.

Mr. Moorhouse has been Mr. Baker's assistant since 1929 and in recent years has been assistant secretary of the company. Mr. Krumhansl has been associated with the company since 1913 and for many years has been assistant treasurer of the company.

Post to Head Steel Group

New York

• • • **L. Abbett Post** has been elected executive vice-president of the American Institute of Steel Construction, T. R. Mullen, President of the Institute, announced. Robert T. Brooks will retire as executive vice-president after 11 yr in that capacity.

L. Abbett Post

Mr. Post has been on the Institute staff since 1942, for the past year as assistant executive vice-president. A native of New York, he is a graduate of Stevens Institute of Technology, Hoboken, N. J. He was formerly an official of Post & McCord, steel contractors. He is also president of the Trade Assn. Executives in New York.

Approves Sale to Dow

Washington

• • • **Sale of surplus** facilities of the Dow-Velasco magnesium plant at Velasco, Tex., to the Dow Chemical Co. of Midland, Mich., for $35,155,000 has been approved by the War Assets Administration. Cost to the government of the property sold was approximately $49 million.

Included in the sale were all facilities of the huge plant except the magnesium metal-producing units; the Styrene and Thickel "N" synthetic rubber plants; and a 725-acre tract of land.

The metal producing units of the magnesium plant will be retained by the government and kept in standby condition for future use should an emergency develop.

Coming Events

Jan. 23-24 **Society of the Plastics Industry**, technical session, Chicago.
Jan. 27-29 **Industrial Diamond Assn. of America, Inc.**, annual convention, Atlantic City, N. J.
Jan. 27-31 **Electrical Engineering Exposition**, New York.
Jan. 27-31 **International Heating and Ventilating Exposition**, Cleveland.
Jan. 28-Feb. 2 **Society of Plastics Engineers**, exhibition, Chicago.
Mar. 17 **American Institute of Mining & Metallurgical Engineers**, world conference on mineral resources, New York.
Mar. 17-19 **American Society of Lubrication Engineers**, annual meeting, Pittsburgh.
Mar. 17-19 **American Gas Assn.**, sales conference, Boston.
Mar. 19-22 **American Society of Tool Engineers**, annual meeting, Houston.
Mar. 22 **Western Metal Conference and Exposition**, American Society for Metals, Oakland, Calif.
Mar. 31-Apr. 2 **Midwest Power Conference**, Chicago.
Apr. 7-10 **National Assn. of Corrosion Engineers**, convention, Chicago.
Apr. 8-11 **American Management Assn.**, packaging exposition, Philadelphia.
Apr. 29-May 1 **Industrial Packaging and Materials Handling Exposition**, Industrial Packaging Engineers Assn. of America, Chicago.

The London ECONOMIST

Disciplines and Democracy-II

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IN THE extra-legal discussions that have followed the capitulation of John L. Lewis to the courts, two reasons for his surrender have been adduced which bear no relation to the law in the case. One is the suggestion, made by a sympathetic columnist, that the sudden drop in temperatures throughout the nation brought out man's primitive fear of the cold and hardened the national temper against him. The other is that his apparent defiance aroused another fear, less primitive but almost as deeply ingrained in this nation, that he was in fact setting himself above the law and proving to be what he has so often been called by his enemies, an anarchist.

It is an axiom of American life that neither John L. Lewis nor any other American, be he labor leader, industrialist, or would-be reformer, can afford to have it generally believed that anything he does is anarchic. Mr. Lewis customarily makes a point of moving according to the authority of the Bible, Shakespeare, and a deep concern for human rights.

Mr. Sewell Avery (who, since his wartime efforts to defy the government for the good of Montgomery Ward, has become the symbol of intransigent capital) sat tight on the sanctity of private property until the Army picked him up and carried him out. The bright young men of the brain trust of the Congress of Industrial Organizations lean on the tables and charts of economic analysis.

The enemies of any of them may call them names, but let the suspicion grow within the neutral middle ground that what they are doing does in fact threaten the life of this democracy, and their power is immediately in danger. Americans may berate their government, criticize its representatives, attack its decisions, but let any man be suspected of trying to destroy it or to substitute another, and the nation rallies against him.

This submission of the individual to the power of the people in the form of law is, of course, the ultimate discipline which a democracy can expect of its citizens. Beyond it lies only the perilous discipline of armed force.

But the law is recognized as a fragile thing which, tested too far, may wear thin and snap in a crisis. There are preliminary disciplines on which the continuance of this republic rests, and their apparent weakening is causing concern that is taking the form of measures intended to cure.

THE founding fathers, who must always be consulted in these matters, relied on the commonly accepted disciplines of an homogenous people speaking the same tongue, attached to the same principles of government, professing the same religion, if with variations, schooled in similar customs, and tempered by a long war fought for the specific purpose of establishing themselves as an independent nation. To these bonds was added common schooling supported by the state to which generation after generation of children had to go to learn the lessons of that heritage.

When, in spite of these barriers, factions arose they were to be given more liberty rather than less in the expectation that competing factions would subdue each other and save the state unnecessary intervention. The system of checks and balances which was set up within a free society developed into a multiple webbing of crossed interests that broke only when war split the North and South apart, and was mended afterwards.

As late as 1907 the commonly accepted ideal was expressed by Elihu Root, Secretary of State under Theodore Roosevelt, who told students at Yale that self-control was the primary discipline on which self-government must depend. "And that requires intelligence," he went on, "so that the true relation of things may be perceived, and also the moral qualities which make possible patience, kindly consideration for others, and capacity for loyalty to certain ideals.

Men must be willing to sacrifice something of their own individual interests for the larger interests of city, state, country; and without that willingness successful popular government is impossible." Those ideals have never departed from the American consciousness. President Roosevelt leaned on their strength when he summoned a new generation of bright young men to help him implement the New Deal in 1933. Eight years later they stirred even his bitter enemies to the gigantic and dangerous undertakings of war.

But meanwhile disintegrating forces were also at work which caused concern. Habitual standards of personal as well as national self-discipline came under attack. The common heritage was diluted by a century of unrestricted immigration on the part of very different peoples from those who had founded the nation. Well-meaning plans for schooling the newcomers in the American way proved inadequate in the face of industrial demands for brawn without concern for brains or loyalties.

Immigrants settled in small colonies of their own, bound together in their turn by their own common heritage of custom, speech and religion. Untouched by the strange life around them, they hardened into monolithic growths within the body politic which could be exploited by an ambitious leader. The old Americans resented the new ones, and in 1920 put up bars against immigration which, while making them feel safe, also made them feel guilty in that they thus denied the right of political refuge which was one of the nation's cornerstones.

THE bonds of common education weakened. The ruling theory in the eighteenth and nineteenth centuries trained students in

(CONTINUED ON PAGE 150)

Italy Plans to Double Pig Iron Production in 1947

Rome

• • • **Production plans** for the Italian steel industry in 1947 call for an output of 510,000 metric tons of pig iron, almost twice that of the previous year, if sufficient coal supplies are made available. Steel requirements for Italy for 1947 are estimated by official sources to be a minimum of 2 million metric tons, and an estimated 500,000 tons of scrap imports will be required.

The peak production of pig iron in Italy was reached in 1940 when

By JACK R. HIGHT
European Editor

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the blast furnaces turned out 882,296 metric tons, and the output of the electric furnaces amounted to 177,122 metric tons, making a total output of 1,059,418 metric tons of pig iron. However, the maximum production of electric furnace pig iron was reached in 1941 with an output of 258,000 metric tons. The Italian output of pig iron in the years 1938 and 1946 is shown in tables I and II.

The widespread destruction caused by the war have considerably reduced the productive capacity of blast furnace pig iron, Only two blast furnaces, rating 200 tons daily output, belonging to the Cogne Steelworks (Aosta), and two blast furnaces, rating a daily capacity of 220 tons and 25 tons respectively, of the Ilvania Steelworks (near Trieste), remained intact.

For obvious reasons, the 1946

TABLE I

Italy's Pig Iron Production in 1938
(in metric tons)

Month	Blast Furnace			Electric Furnace			Total
	Steelmaking	Foundry	Total	Steelmaking	Foundry	Total	
January	36,397	27,551	63,948	919	480	1,399	65,347
February	48,373	9,382	57,755	144	106	250	58,005
March	52,423	12,146	64,569	284	138	422	64,991
April	50,214	13,171	63,385	120	1,200	1,320	64,705
May	52,084	10,866	62,950	2,201	2,686	4,887	67,837
June	54,294	9,074	63,368	8,126	5,572	13,698	77,066
July	53,207	13,252	66,459	9,553	5,955	15,508	81,967
August	54,110	14,211	68,321	10,964	4,285	15,249	83,570
September	57,624	9,060	66,684	9,890	4,193	14,083	80,767
October	58,271	9,575	67,846	7,861	2,948	10,809	78,655
November	56,988	10,052	67,040	818	2,105	2,923	69,963
December	60,303	9,542	69,845	8	103	111	69,956
Total	634,288	147,882	782,170	50,888	29,771	80,659	862,829

TABLE II

Italy's Pig Iron Production in 1946
(in metric tons)

Month	Blast Furnace			Electric Furnace			Total
	Steelmaking	Foundry	Total	Steelmaking	Foundry	Total	
January	.....	.....	.....	2,306	829	3,135	3,135
February	.....	.....	.....	779	941	1,720	1,720
March	.....	.....	.....	464	1,344	1,808	1,808
April	.....	.....	.....	3,317	6,200	9,517	9,517
May	.....	.....	.....	8,034	7,600	15,634	15,634
June	.....	.....	.....	12,364	7,682	20,046	20,046
July	.....	.....	.....	17,693	10,512	28,205	28,205
August	.....	.....	.....	15,981	10,581	26,562	26,562
September	.....	.....	.....	18,391	11,183	29,574	29,574
October	.....	1,718	1,718	12,010	4,250	16,260	17,978
*November	3,500	3,000	6,500	500	2,500	3,000	9,500
*December	11,500	1,500	13,000	.....	.....	.....	13,000
Total	15,000	6,218	21,218	91,839	63,622	155,461	176,679

* Estimated production.

TABLE III

Italy's Production of Steel Ingots and Steel Castings in 1938.
(in metric tons)

Month	Open-hearth Furnace	Electric Furnace	Con-verter	Total
January	123,882	45,949	999	170,830
February	127,623	45,642	832	174,097
March	149,395	49,086	577	199,058
April	141,541	47,998	633	190,172
May	140,498	46,862	974	188,334
June	147,835	57,598	923	206,356
July	152,894	61,124	976	214,994
August	140,850	58,063	1,199	200,112
September	144,451	61,532	951	206,934
October	139,288	54,804	990	195,082
November	139,365	50,353	938	190,656
December	136,691	48,902	638	186,231
Total	1,684,313	627,913	10,630	2,322,856

TABLE IV

Italy's Production of Steel Ingots and Steel Castings in 1946.
(in metric tons)

Month	Open-hearth Furnace	Electric Furnace	Con-verter	Total
January	32,050	23,353	44	55,629
February	34,199	22,984	24	57,207
March	35,370	34,477	.....	69,847
April	36,970	44,669	.....	81,639
May	39,056	56,811	.....	95,867
June	38,010	63,297	6	101,313
July	43,787	69,245	13	113,045
August	46,432	64,518	7	110,957
September	55,174	68,608	10	123,792
October	67,832	66,220	10	134,062
*November	76,000	23,200	10	99,210
*December	66,000	23,200	10	89,210
Total	570,880	560,764	134	1,131,778

* Estimated production.

output of the blast furnace situated in the Trieste district cannot be taken into account. Of the blast furnaces damaged, one located at the Ilva-Bagnoli Works (Naples), with a daily capacity of 300 tons, has been reactivated, while another blast furnace of the same capacity is being repaired at the same works.

As a result of the deficit and irregular supply of coking coal, as well as of the low quality of coking coal provided, it was not possible to fire the 300-ton coke blast furnace at Bagnoli until October of 1946. The furnace will be operated on a limited scale up to July 1947, owing to the existing necessity of reconstructing the blower, parts of which were looted by the Germans.

In November 1946, the first blast furnace of the Cogne Steelworks in Aosta was also reactivated.

As far as the productive capacity of electric furnace pig iron is concerned, the respective plants were only slightly affected by the war, so that the electric pig iron produced in 1946 is roughly the same as prewar figures.

On the whole, the output of 183,569 tons of pig iron in 1946 turned out to be considerably less than the minimum requirements for the fabrication of steel produced during the same year.

Italian production of steel in 1938 and 1946 is indicated in tables III and IV.

The peak production of openhearth steel in the last decade was attained in 1938 with an output of 1,685,000 tons, and of electric furnace steel in 1941 with approximately 800,000 tons. The actual potential productive capacity of steel was only slightly affected by the war, and has been nearly completely restored.

Electric furnace production in 1946 was as high as possible, taking into account the limited availability of electric power and electrodes; openhearth blast furnace output, the maximum that could be obtained with the extremely deficient supplies and low quality of gas coal, amounted to about 30,000 tons per month.

Moreover, the limited shipments

TABLE V

Italy's Rolled Steel Production
(in metric tons)

Month	1938	1946
January	134,213	47,043
February	137,894	49,144
March	162,107	59,555
April	135,928	65,189
May	150,234	70,813
June	160,932	71,585
July	152,377	79,343
August	143,982	68,205
September	156,157	89,178
October	141,668	*78,078
November	131,126	*49,314
December	127,947	*49,314
Total	1,734,565	776,761

* Estimated production.

TABLE VI

Pig Iron Output Planned for 1947 in Italy.

Ironmaking furnaces	Metric tons
Electric furnaces	180,000
Blast furnaces (Cogne)	100,000
Blast furnaces (Bagnoli)	130,000
Blast furnaces (Ilvania-Trieste)	100,000
Total	510,000

TABLE VII

Estimated Italian Requirements of Crude Steel in 1947.

Steelmaking furnaces	Metric tons
Electric furnaces	660,000
Openhearth lignite furnaces	180,000
Openhearth coal furnaces	1,160,000
Total	2,000,000

of foreign pig iron (mainly UNRRA), designed to replace Italy's insufficient output of domestic pig iron, made constant difficulties for Italy's openhearth steelworks.

Rolled steel output in 1938 and 1946 is indicated in table V.

Estimated production of pig iron in 1947 is shown in table VI, totaling 510,000 tons. To produce this amount a monthly supply of 6000 tons of coal powder will be required for the agglomeration of the iron ore, and 45,000 tons of coking coal.

The minimum requirements of crude steel for Italy in 1947 are estimated at 2 million tons (see table VII), and to attain this production a monthly supply of about 100,000 tons of gas coal would be required, and 10,000 tons of coke for ferroalloys, dolomite and lime.

The realization of the planned output is primarily contingent on the possibility of obtaining the required monthly shipments of coal. Due particularly to the shortage of coal, 1946 output of steel was equal to only one half of that estimated for 1947.

In regard to the pig iron necessary for the fabrication of 2 million tons of steel, the output of pig shown in table VI would fall 100,000 tons short of requirements, taking into consideration that 200,000 tons are needed for the pig iron foundries. However, should the Ilvania (Trieste) steelworks be unable to operate, the overall shortage of pig iron would mount to 200,000 tons instead of the estimated deficiency of 100,000 tons.

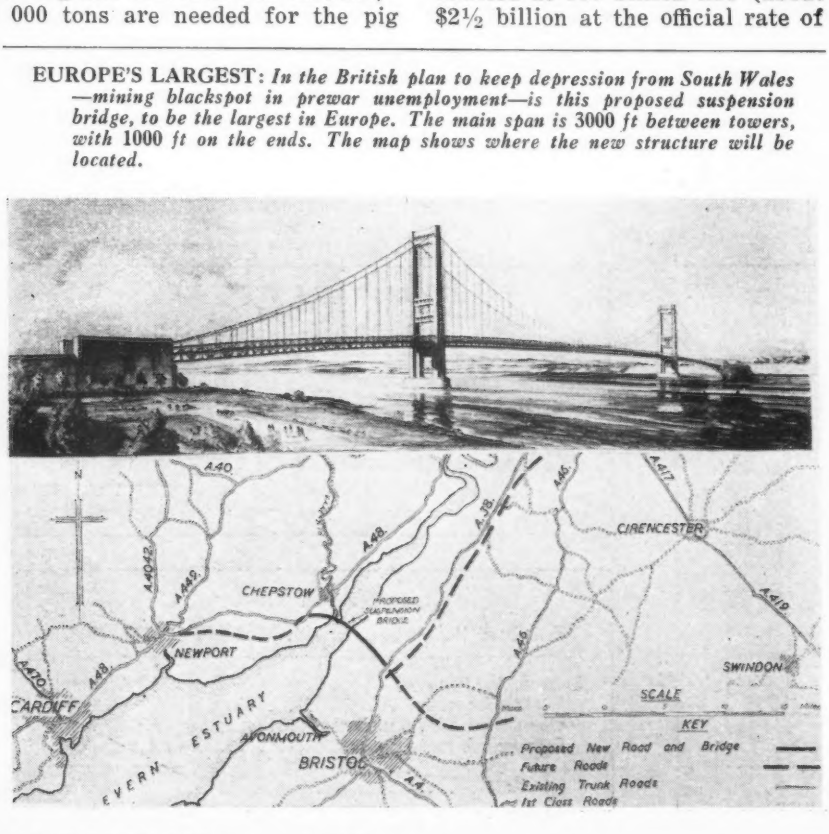
In view of the present situation of ferrous scrap on the Italian market, import requirements for 1947 are estimated at 500,000 tons of scrap.

Considering that in 1947 Italy will be fully employed in the work of reconstruction and rehabilitation as a result of the extensive devastations caused by the war, and that jobs must be found for unemployed workers, Italians feel that it is essential that the international organizations in charge of the distribution of raw materials take concrete measures to insure the shipments of the required quantities of coal, pig iron and ferrous scrap. These commodities are practically indispensable for the domestic steelmaking industry, which is the basis for the development of work in the majority of the steel-using industries of Italy.

An indication of the magnitude of the reconstruction work which must be done in Italy was given by former President De Gasperri in his last speech in Milan recently. War damages in industry are estimated at 550 billion lire (about $2½ billion at the official rate of exchange), in agriculture 300 billion lire (about $1,022 million), in the railways 4 billion (about $17 million), in the ports 26 billion (about $115 million), and to buildings nearly 1000 billion lire (about $4½ billion).

The unemployment problem in Italy is one of the anomalies of the European situation. Official figures at the beginning of 1946 placed the total of unemployed in the country at 1,946,000 an increase of some 88,000 over the previous count at the end of September. More than half of the total are said to be industrial workers. In contrast most of the other countries in Europe are suffering seriously for lack of manpower. Some of Italy's surplus has already been exported to France, and agreements with Belgium, England and possibly Sweden, may furnish Italian workers to those countries.

EUROPE'S LARGEST: *In the British plan to keep depression from South Wales —mining blackspot in prewar unemployment—is this proposed suspension bridge, to be the largest in Europe. The main span is 3000 ft between towers, with 1000 ft on the ends. The map shows where the new structure will be located.*



Wrought Iron Tanks, 50-yr Old, Are Moved For the Second Time

New York

• • • **Two wrought iron** storage tanks which served for more than 50 yr in the Findlay fields of the Ohio Oil Co., but had been previously used in Pennsylvania by the Buckeye Pipe Line Co., have been purchased by the Dow Chemical Co., dismantled, shipped to Marysville, Mich., and the plates used in construction of a new all-welded tank.

Representatives of the Austin Co., Midland, Mich., which handled the project for Dow Chemical, reported that the iron plates do not show any appreciable damage, although it had been so long since they were painted that it was difficult to find any paint remaining on the metal surface. The tank bottoms evidently had never been painted.

The tanks are believed to have been of 7-ring construction, 35,000 bbl capacity, when first used, but when shipped to Ohio the top or seventh ring was removed. They were approximately 85 ft in diameter, and 25 to 27 ft in shell height. The first ring is believed to have been composed of ⅜-in. plate; second and perhaps the third rings, 5/16 in. and the remaining rings and bottoms, ¼ in.

Says Industrial Output Tops Prewar Period by 50 Pct

Washington

• • • **Since the end of the war,** American industrial production remained at least 50 pct above the average of the late thirties, recovered more than half the 38 points it dropped in the first two months after VJ-Day, set new peacetime highs and at the same time kept unemployment on a virtual non-existent basis, according to former CPA Administrator John D. Small in his final report to the White House, covering the p stwar period through October 1946.

Current shortages are serious only to the particular industry or group affected, he declared, and he added that of those remaining "none are of the type which can be cured by further exercise of the war powers of the government."

There were more than 700 controls at wartime peaks, he said, but at the time of his report these had been reduced to less than 50.

Production, the report went on, which fell from a wartime peak of $206 billion annually to $182 billion during the first quarter of 1946 had recovered almost all its loss and as of October stood at $202 billion.

More specifically, the output of steel ingots and finished steel products has fluctuated from time to time but remains at about the same levels as at the end of the war—about 90 pct of capacity. Pig iron production, spurred to some extent by premium payments under the housing program, has increased more than 10 pct above levels at the end of the war. Shipments of iron castings have increased by 40 pct.

On the other hand, it was stated, domestic production of refined copper slumped badly in the middle of 1946 but by October had recovered to levels of August 1945 although still considerably below the 1941 record. However, brass mill products reached 250 million lb, nearly three times the prewar monthly rate.

Lead continues short and the report forecast that 1947 supplies would fall short of requirements by about a third and that tin would not be available in sufficient quantities to meet unrestricted demand. Shortages still exist in wire and nails; this with difficulty in obtaining sheet steel, will combine to hamper production of metal food and other containers.

In the machinery field, output of farm equipment rose 40 pct since the end of war while production of mechanical presses has tripled to bring manufactures to six times that of 1939. Food processing machinery was up 75 pct over the prewar rate and despite limitation of silicon sheet steel, fractional horsepower motors production is 2½ times the VJ-Day rate.

Inventories were shown in the report to be rising at an accelerated rate. During the first 15 months of the postwar period, industry transferred $5 billion in war materials to the government and managed to acquire $12 billion in civilian type stocks. Total October wholesale, manufacturing and retail inventories were placed at $34 billion.

Slowed to a virtual standstill by VJ-Day, most consumer durables showed rapid recovery. Output of 286,000 automobiles in October was ahead of the 1938-39 rate and only 9 pct below the intensified production of 1941; October truck production of 110,000 was up 50 pct over prewar rates.

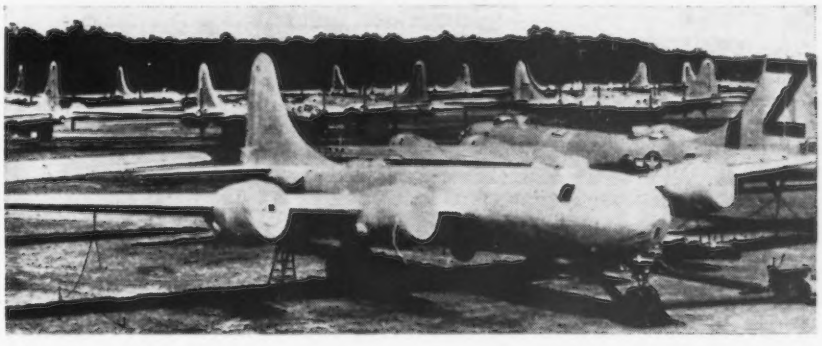
Most other consumer durables kept pace with vehicles. Radio and electric range output tripled to rise above the 1940-41 production while washing machines and vacuum cleaners also set new records. Of the major types of durable goods, only refrigerators and sewing machines failed to rise to prewar levels.

A sharp increase was reported in the production rates of railroad cars which is now double the 1941 rate but output of freight cars is still one-third short of prewar levels; it is estimated that it will require two years to catch up to unfilled orders.

This reconversion to peacetime economy has been accomplished without any notable drop in employment which remained at around 58 million persons, highest in peacetime history; at no time did unemployment exceed the 2.7 million in March 1946—the big demobilization period for the armed forces, the report declared.

"Generally the economy is in a healthy condition," Mr. Small concluded. "The most serious war-born shortages have been filled with the important exception of housing. Those which exist stem mainly from international supply problems which must be solved by particular techniques; from lack of plant capacities which will be solved in the long run, and from shortages of natural resources which can be solved only by finding substitutes or new sources.

NOT DUMMIES: *A strippable coating being applied to B-29's in storage at Robbins Field, Ga., makes the ship in the foreground look like a camouflage dummy. The dark spots are inspection windows.*



Industrial Briefs...

• IBM BUILDS—Work has been started at the Poughkeepsie, N. Y., plant of International Business Machines Corp. to construct the first unit of the company's building program.

• BRITISH ORDER — The Twin Coach Co. has received an order for 100 34-passenger buses from the British Columbia Electric Railway Co. The total cost is estimated at $1,760,000 and delivery is to be made in 1947 and 1948.

• CONSOLIDATION—The corporate consolidation of Columbia Steel & Shafting Co., Edgar T. Ward's Sons Co., both of Pittsburgh, and Summerill Tubing Co. of Bridgeport, Pa., has been announced. For the past years, the three concerns have operated as affiliated companies in the sense of parent companies and wholly-owned subsidiaries. Columbia Steel & Shafting is the surviving corporation, and Edgar T. Ward's Sons and Summerill Tubing Co. will act as operating divisions.

• TO HEAD STEEL GROUP — O. W. Irwin has become president of The Rail Steel Bar Assn. with headquarters in Chicago. For the past eleven years Mr. Irwin was manager of sales of the concrete bar division of The Carnegie-Illinois Steel Corp. and was retired at the end of October, 1946.

• BUYS MAGNESIUM PLANT—Metal Mold Magnesium Corp., Cedarburg, Wis., has purchased the government-owned magnesium casting plant operated by them during the war for $50,000, according to WAA reports.

• COMBINE FACILITIES — Aro-Cast Corp. and Precise Castings Corp., division of The Cooper Alloy Foundry Co. of Hillside, N. J., have combined facilities in new quarters and are maintaining all of the basic personnel of both corporations.

• CHANGES NAME — The Petroleum Equipment Co., a wholly-owned subsidiary of Bethlehem Pacific Coast Steel Corp., will now be known as the Bethlehem Supply Co. of Calif. The announcement was made by H. H. Fuller, president of both companies.

• ACQUISITION—Republic Brass Co. of Cleveland, for more than 30 yr a manufacturer in the plumbing industry, has been acquired by the Briggs Mfg. Co., producer of Briggs Beautyware plumbing fixtures. There will be no change in the management of the Republic Brass nor in its sales and distribution policies. Richard Blywise will continue as general manager.

• SOAPLESS SOAP — The construction of a $3 million plant in Monsanto, Ill., to expand the production of "soapless soap" has been announced by the Monsanto Chemical Co. A one story, concrete building already under construction will be in operation early next year. The Monsanto plant at Nitro, W. Va., is also being enlarged to further increase the soaps which are sold under the name of Santomerse. Virtually hundreds of uses, household and industrial, have been found for the detergents which are very mild and practically odorless and tasteless.

• OPENS SERVICE LAB—A new metallurgical service laboratory has been completed and put into operation by Ajax Electric Co., Inc., Philadelphia manufacturer of Ajax-Hultgren electric salt bath furnaces. The laboratory, which is considered a model salt bath installation, contains a battery of seven Ajax furnaces, with accompanying quench tanks, acid pickling tanks, rinse tanks and a drying oven—all of commercial proportions—permitting the treatment of virtually any normal size of work by any process for which salt bath furnaces are used.

Announces Revisions In Export Prices Of Carbon Steel Products

New York

• • • **Further revisions** in export prices of carbon steel products have been announced here. It is reported that U. S. Steel Export Co. has issued a new schedule of prices, effective Jan. 2, to take account of the freight rate increase and some domestic price revisions. These are prices, subject to adjustment for price at time of shipment, f.o.b. mill, with freight allowed to New York, Philadelphia or Baltimore. Prices, per 100 lb unless otherwise noted, are as follows:

Plates	$3.28
Floor plates	4.53
Structural shapes	3.03
Merchant bars	3.28
Reinforcing bars	3.13
Sheet piling	3.53
Hot-rolled sheets, 10 ga.	3.21
Hot-rolled sheets, 24 ga.	4.11
Cold-rolled sheets M/R, 17 ga.—2 ton packages	4.11
Galvanized sheets, plain, 24 ga.	5.08
Galvanized sheets, corrugated, 24 ga.	5.08
Hot-rolled strip	3.03
Cold-rolled strip	3.73
Tinplate—Coke 107 lb, base box	6.63
Bright nail wire	3.83
Black annealed wire	4.48
Galvanized plain wire	4.93
Galvanized barbed wire, Lyman 4 pt.-5 in., 80 rod spool	4.65
Galvanized barbed wire, Glidden 2 pt.-4 in., 80 rod spool	4.27
Wire nails	4.30
Bright staples	5.10
Galvanized staples	5.75
Ingots, per gross ton	44.39
Billets, blooms, slabs, rerolling quality, per gross ton	52.39
Billets, blooms, slabs, forging quality, per gross ton	60.39
Wire rods—in coils, per gross ton	67.04
Skelp	2.88
Standard rails—over 60 lb, per net ton	63.08
Light rails—60 lb and lighter, per net ton	67.35
Girder rails, per net ton	69.60
Joint bars for standard rails	3.95
Tie plates	3.95
	Discount, pct
American Standard Pipe T&C	
1 to 3 in. black buttweld	55.2
1 to 3 in. galvanized buttweld	42.2
3½ to 6 in. black seamless	51.7
3½ to 6 in. galvanized seamless	38.2
English Gas Tubes, ⅜ in. to 3 in.	
Black	55.5
Galvanized	45.5

Construction Steel . . .

New York

• • • **The total** estimated bookings of fabricated structural steel for the first 11 months of 1946, according to reports received by the American Institute of Steel Construction, amounted to 1,624,812 tons or an increase of 19 pct over the average of 1,366,183 tons booked for the same period in the 5 prewar yr 1936 to 1940.

Shipments have shown a gradual monthly increase during the year and have totaled 1,384,341 tons for the 11 months, which is a slight increase over the average reported for the same period in the 5 prewar yr. The tonnage available for future fabrication at Nov. 30 has increased to 665,362 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry 1946	Estimated Total Tonnage for the Entire Industry Avg. 1936-1940
Contracts Closed		
January ...	235,817	107,578
February ..	132,707	96,280
March	173,871	124,558
April	128,671	110,783
May	165,290	126,237
June	131,010	125,835
July	137,241	152,481
August	165,590	113,135
September ..	114,295	137,982
October	141,516*	141,557
November ..	98,804	129,757
Total	1,624,812	1,366,183
Shipments		
January ...	107,490	92,578
February ..	63,803	88,626
March	102,803	115,031
April	122,511	123,650
May	124,408	123,225
June	126,850	129,969
July	140,224	127,422
August	157,510	136,389
September ..	141,933	137,255
October	152,321*	140,944
November ..	144,488	127,873
Total	1,384,341	1,342,962
Tonnage available for fabrication within the next 4 months	665,362	350,268

*Revised.

• • • **Fabricated steel awards this** week included the following:

2000 Tons, Oswego, N. Y., power station for Central New York Power Co. to Bethlehem Steel Co. Stone & Webster Engineering Co., Boston engineers.

2000 Tons, Buffalo, power plant extension for Buffalo Niagara Electric Co. to Bethlehem Steel Co. Stone & Webster Engineering Co., Boston engineers.

1000 Tons, Colorado, scroll casing for hydroelectric installation, Baldwin Locomotive Co. to Bethlehem Steel Co., Bethlehem, Pa.

605 Tons, Maine, 11 bridges various locations to Phoenix Bridge Co., Phoenixville, Pa.

600 Tons, Chicago, industrial building for Edith Bldg. Corp. to Wendnagle & Co., Chicago.

555 Tons, Terre Haute, Ind., extension to Dresser Power Station to Bethlehem Steel Co., Bethlehem, Pa.

280 Tons, Reuters, Ill., State of Illinois, Madison County bridge section 202 F-F to Illinois Steel Bridge Co., Jacksonville, Ill.

225 Tons, Philadelphia, Margaret-Orthodox elevated station, to Cantley & Co., Philadelphia.

100 Tons, Presque Isle, Me., state bridge to Fort Pitt Bridge Works, Pittsburgh.

• • • **Fabricated steel inquiries** this week included the following:

6000 Tons, Buffalo, N. Y., veterans' hospital, U. S. engineer.

5300 Tons, Trenton, Mich., power house for Detroit Edison Co.

1900 Tons, Detroit, bessemer and mixer plant building for Great Lakes Steel Corp., Detroit.

1500 Tons, Lewiston, Idaho, bridge over Clearwater river.

1200 Tons, Poughkeepsie, N. Y., building for International Business Machines Co., New York.

800 Tons, Harrisburg, Pa., Pennsylvania R.R., diesel shop, due Jan. 16.

700 Tons, Tecumseh, Kan., extension to power plant.

700 Tons, Smith Bluff, Tex., tank for Pure Oil Co., Chicago.

530 Tons, Roslyn, Pa., Pennsylvania R.R., bridge over Chartiers Creek, bids in.

500 Tons, Fort Gibson Dam, N. M., trestle.

460 Tons, Mexico, theatre building.

425 Tons, Chicago, store for Jewel Building Corp.

300 Tons, Gainesville, Wis., canning plant.

300 Tons, Janesville, Wis., canning plant.

300 Tons, Whiting, Ind., Standard Oil Co. of Indiana, comp. unit.

190 Tons, La Crosse, Wis., tank for the Early Oil Co.

150 Tons, Minneapolis, Minn., St. Catherine's High School building.

• • • **Reinforced bar awards this** week included the following:

2500 Tons, Chicago, Dearborn Subway to Carnegie-Illinois Steel Corp. through S. A. Healy Co. and Peter Kewitt & Sons.

1250 Tons, East Peoria, Ill., engine building for Caterpillar Tractor to Bethlehem Steel Co. through S. M. Nielsen Co.

295 Tons, Oakland, Calif., East Bay Municipal Utilities District, Spec. 73, pipeline from Geary Road, Walnut Creek to Bixler Station, to Western Pipe & Steel Co., San Francisco.

• • • **Reinforcing bar inquiries** this week included the following:

2340 Tons, Odair, Wash., miscellaneous bars for inlet feeder canal, Bureau of Reclamation, Denver, Inv. G-38, 181A, bids to Jan. 14.

1740 Tons, Coulee City, Wash., miscellaneous bars for main canal, Bureau of Reclamation, Denver, Inv. G-38, 184-A, bids to Jan. 13.

1000 Tons, Enid, Mass., for dam and spillways, general contract bid to be opened by U. S. Engineers at Vicksburg Jan. 3.

180 Tons, Clovis, Calif., Big Dry Creek reservoir and outlets, U. S. Engineer Office, Sacramento, Spec. 1241, bids to Feb. 4.

170 Tons, Mountain Home, Idaho, miscellaneous bars, Anderson Ranch Dam, Bureau of Reclamation, Denver, Inv. 22, 752-A, bids to Jan. 9.

135 Tons, San Rafael, Calif., undercrossing on Linden Lane, California Div. of Highways, Sacramento, bids to Jan. 29.

100 Tons, Lake Andes, S. D., access road, Port Randall reservoir.

• • • **Piling awards** this week included the following:

600 Tons, Chicago, Dearborn Subway to Carnegie-Illinois Steel through S. A. Healy Co. and Peter Kewitt & Sons.

390 Tons, Chicago, 59th St. harbor improvements to Carnegie-Illinois Steel through Harry A. Thompson & Co.

To Scrap Six Carriers

Portland, Ore.

• • • **Oregon Steel Mills** was last week put in a very favorable position for immediate relief of its scrap problem with the arrival from Puget Sound of the U.S.S. Salamaua, the first of six aircraft escort carriers to be scrapped in the Portland area by the newly formed Zidell Ship Dismantling Co.

The company has been planning to use the 1500-ft outfitting dock of Commercial Iron Works for the shipbreaking operations but as yet has not been informed of results of its high bid of $16,567 a year for a 2-yr lease. Temporarily the Salamaua and another of the six aircraft escort carriers, the Tulagi, will be berthed at Oregon Steel Mills dock pending the beginning of the scrapping operations.

No Tears for Torrance

Los Angeles

• • • **Few tears are being shed** locally over the announcement of the Federal government that it is accepting bids until January 21 for the $24-million aluminum reduction plant at Torrance, California.

It is generally conceded that operation of this unit is impractical under competitive conditions and a limitation of available power is another factor which makes its operation unfeasible.

Principal objection to the sale of this property is the probability that it will not be operated as an aluminum reduction plant and comes from the Central Labor Council whose objections are based on a possible loss of industrial strength in the area.

MACHINE TOOLS

. . . News and Market Activities

Upward Trend in Tool Prices Continues

• • • **While many of the** machine tool industry's qualified critics expect 1947 to prove a lean and hungry year, the upward trend in machine tool prices which has been under way since November and which was pretty well completed by the flurry of price increases by some of the major producers at the end of December, is hardly indicative of pessimism in the industry generally.

Many of the increases have been made with a good deal of unwillingness, because of the competitive situation and the vast number of government-owned surplus machines still to be sold by WAA, but costs of basic materials and components left many a producer with little choice, according to some observers.

On an industrywide basis, the increase in machine tool prices is expected to amount to about 10 pct, considerably less than the increases which builders have had to meet on basic materials and components. Many of these increases had been put in effect by escalator clauses during December, but some observers believe that a number of companies suspended their escalator clauses during that month, which is in part responsible for the good showing sales-wise the industry made.

According to one report, however, the automobile industry has estimated that new tools (presumably of all kinds) cost 60 pct more than VJ-Day and 150 pct more than prewar. This will come as news to the machine tool industry, at least.

As for 1947, one builder in the Cleveland area has already estimated that his business will run at least 85 pct of last year. While this by no means represents the thinking of the industry generally, it is a well-known fact that strikes in 1946 brought many a customer around to thinking of high production and low unit cost in the most urgent terms in many a day.

In the Detroit area, most producers of machine tools are entering 1947 with a fair backlog which is holding up surprisingly well in many classifications despite recent cancellations or postponements of tooling programs by several motor car makers.

Many firms report brisk activity in specialized tooling fields, although the demand for standard equipment and tools is decidedly on the slow side. Recent advertisements in Detroit papers indicate that the services of a number of tool designers are now available in this area.

There is general agreement here that the volume of business to be placed in Detroit during 1947 will be largely determined by developments on the labor front and future commitments on new models by major manufacturers will depend entirely on their ability to see their way through existing labor costs. The pronounced trend to eliminate hand labor at every opportunity is a factor favoring machine tool suppliers. Most observers here are now of the opinion that the largest single factor leading to the scrapping of the 1948 Chevrolet "A" body dies was uncertainty about labor.

There is growing interest here in the potential market for plastics in automobiles and some well-known producers of machine tools are reported to see here a market for equipment that will soon be in great demand by the automobile industry. The recently reported adoption of a plastic fuel line specification by a major auto producer has given further impetus to this development.

As regards the machine tool surplus, it is interesting to note that since the close of its wartime activities Chrysler Corp. has converted more than 17,500 machines that had been on war work to peacetime activity. These machines were reconditioned, retooled and restored to civilian operation. Chrysler bought from the government nearly 1000 additional machines that had to be tooled and placed. An additional 1200 machines were purchased from machine tool builders, and more than 7900 government-owned machine tools were moved out to storage.

In Cincinnati, Lodge & Shipley Machine Tool Co. announced purchase of the turret lathe and hand screw machine business of Acme Machine Tool Co. According to William L. Dolle, president and general manager of Lodge & Shipley, acquisition of Acme will amplify his company's production of machine tools and by means of the acquisition will be the only company in the machine tool business offering a complete service in the machining of cylindrical surfaces.

Lodge & Shipley can offer engine lathes, tool room lathes, turret lathes, contour-turning or boring lathes, gap lathes, large hollow spindle lathes and in combination to accommodate customers' requirements.

Purchase of Acme did not include the outstanding capital stock of the company, but only the patents, good will, trademarks, jigs, fixtures, inventory and associated items comprising the turret lathe and hand screw machine business. Plant machinery and buildings were not involved, as Acme's present owners contemplate the use of these facilities in the production of a small shearing machine.

In Boston and the East, most machine tool builders are in pretty good shape. While new business fell off in the last quarter of 1946, about 80 pct of the companies have a bigger than prewar payroll, a first half order backlog and a reassuring outlook of additional business before June 1. Without renewed labor difficulties, the trades' chances of making money the first half of 1947 at least are very good, according to most company sources.

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

	Jan. 7, 1947	Dec. 31, 1946	Dec. 3, 1946	Jan. 8, 1946
Flat-Rolled Steel: (cents per pound)				
Hot-rolled sheets	2.50	2.50	2.425	2.20
Cold-rolled sheets	3.20	3.20	3.275	3.05
Galvanized sheets (10 ga.)	3.55	3.55	4.05	3.70
Hot-rolled strip	2.50	2.50	2.35	2.10
Cold-rolled strip	3.20	3.20	3.05	2.80
Plates	2.65	2.50	2.50	2.25
Plates, wrought iron	5.95	5.95	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.00	$5.00	$5.00
Tinplate, electro (0.50 lb)	5.05	4.50	4.50	4.50
Special coated mfg. ternes	4.90	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.50	2.25
Cold-finished bars	3.20	3.20	3.10	2.75
Alloy bars	3.05	3.05	2.92	2.70
Structural shapes	2.50	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	6.15	6.15	4.76	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$43.39†	$43.00*
Light rails	2.85	2.85	49.18†	45.00*
*per gross ton †per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$39.00	$39.00	$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	42.00	39.00	39.00	36.00
Forging billets	50.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	61.00	61.00	58.43	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron: (per gross ton)	Jan. 7, 1947	Dec. 31, 1946	Dec. 3, 1946	Jan. 8, 1946
No. 2, foundry, Phila.	$32.43	$32.43	$30.43	$27.59
No. 2, Valley furnace	30.50	30.50	28.50	25.75
No. 2, Southern, Cin'ti	29.80	29.80	27.80	26.19
No. 2, Birmingham	26.88	26.88	24.88	22.13
No. 2 foundry, Chicago†	30.50	30.50	28.50	25.75
Basic, del'd eastern Pa.	31.93	31.93	29.93	27.09
Basic, Valley furnace	30.00	30.00	28.00	25.25
Malleable, Chicago†	30.50	30.50	28.50	25.75
Malleable, Valley	30.50	30.50	28.50	25.75
Charcoal, Chicago	42.99	42.99	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$32.25	$32.25	$25.25	$20.00
Heavy melt'g steel, Phila.	31.00	31.00	24.50	18.75
Heavy melt'g steel, Ch'go	*29.75*	30.25	25.25	18.75
No. 1, hy. comp. sheet, Det.	27.00	27.75	22.32	17.32
Low phos. plate, Youngs'n	34.25	34.25	27.75	22.50
No. 1, cast, Pittsburgh	40.38	37.50	29.00	20.00
No. 1, cast, Philadelphia	41.50	41.50	40.50	20.00
No. 1, cast, Chicago	*42.50*	44.00	37.75	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$8.75	$8.75	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	19.50	19.50	19.50	12.00
Copper, Lake, Conn.	19.625	19.625	19.625	12.00
Tin, Straits, New York	70.00	70.00	70.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	12.35	12.35	11.65	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00		35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	28.25	28.25	23.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 7, 1947	2.87255¢ per lb.	$30.14 per gross ton	$31.00 per gross ton
One week ago	2.83599¢ per lb.	$30.14 per gross ton	$31.17 per gross ton
One month ago	2.70711¢ per lb.	$28.13 per gross ton	$25.00 per gross ton
One year ago	2.54490¢ per lb.	$25.37 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	$30.14 Dec. 10	$25.37 Jan. 1	$31.17 Dec. 24	$19.17
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	$18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 15	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.

NONFERROUS METALS

. . . News and Market Activities

National Lead Buys Antimony Producer

New York

• • • **The National Lead Co.**, New York, has purchased the properties of the Texas Mining & Smelting Co., Laredo, Tex., effective Jan. 1. The Texas company is the sole domestic primary producer of antimony metal and oxide from imported ores and concentrates.

The property had been offered for sale and the National Lead Co., a large consumer of the metal for antimonial lead, acquired the property in order to continue to provide for its own requirements. The sale of antimony and antimony oxide to other customers will now be handled by the National Lead Co. The Texas company's products had been distributed by Stanley Fullwood of New York. It is reported that there are to be on changes in the personnel of the antimony producing facilities.

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Require Lead Reports

Washington

• • • **While revocation** of all controls on the use of lead became effective Dec. 27, CPA has announced that all inventory restrictions still remain in effect. At the same time, CPA reserved government stocks of lead, currently estimated at around 37,000 tons, for emergency release only.

The following consumers' and producers' reporting forms must also continue to be filed with CPA:

CPA-95—A monthly report of inventory, consumption and shipments of lead.

CPA-2919 — Consumption and stocks of scrap and secondary lead and tin.

CPA-2920—Producers report on production, stocks and shipments.

Dept. of Interior, Bureau of Mines Form 6-1112-M—Dealers' report on nonferrous scrap metals.

In addition to revoking the lead order, M-38, on Dec. 27, CPA has also lifted controls governing the use of lead in pigments, insecticides and ethyl fluid.

CPA also removed lead users from the list of those eligible for priorities assistance in obtaining the metal.

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Lead

• • • **Consumers of lead** are disappointed that the government has not been willing to allocate metal from the stockpile for January shipment. It is reported that producers will require 30 to 60 days in order to step up production and arrange for lead imports. Meanwhile, consumers are required to curtail their operations because of the lead shortage. Foreign lead previously contracted for by RFC will be coming into the country during the first quarter and will be used only to build up the stockpile. This will include lead coming from Mexico, Canada and Japan. Producers consider that if an additional month's allocation of some 15,000 to 20,000 tons were to be made, the transition from government control of imports and allocation could have been made without undue hardship on consumers. By February, lead producers expect to be on six-day operations. With the recent increase in lead prices, all lead producers are said to have been excluded from the benefits of the Premium Price Plan.

U. K. Permits Imports Of Aluminum Products

Washington

• • • **The British Board** of Trade has added several aluminum items to the list of products which may be imported into the United Kingdom in limited quantities under an arrangement between the British and United States Governments, the Dept. of Commerce reported recently.

The items are: aluminum and aluminum alloys in sheets, disks, wire, tubes, rods, angles, shapes and sections; aluminum kitchen utensils other than cooking utensils; and beer barrels made of aluminum alloys.

Each American producer is permitted to ship a yearly amount of each item not to exceed 20 pct of the value of his average annual shipments of the item to the United Kingdom during the base years 1936, 1937, and 1938. During the war years none of these products could be imported into the United Kingdom.

•

Stop Buying Tin Ores

London

• • • **The British Ministry** of Supply has announced that its Malayan tin ore buying agency, known as Toba, ceased to buy tin concentrates in Malaya as of the end of the past year.

Producers in these countries are now free to sell concentrates to the smelters, but the British ministry will continue to buy all of the metallic tin produced by the smelters in Malaya.

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Raise Beryllium Copper

Reading, Pa.

• • • **The Beryllium Corp.** has announced price increases on beryllium copper strip, rod and wire to bring these rolled products in accord with production costs. Under the OPA pricing basis the extras for beryllium copper rolled products were the same as for phosphor bronze. The new price schedule changes base prices and extras.

Nonferrous Metals Prices

Cents per pound

	Jan. 1	Jan. 2	Jan. 3	Jan. 4	Jan. 6	Jan. 7
Copper, electro, Conn.	19.50	19.50	19.50	19.50	19.50	19.50
Copper, Lake, Conn.	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	12.35	12.35	12.35	12.35	12.35	12.35

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	28.25
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.50
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	19.50
Copper, lake, Conn. Valley	19.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110.00
Lead, St. Louis	12.35
Lead, New York	12.55
Magnesium, 99.8 + %	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$88 to $90
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$53 to $56
Silver, New York, cents per oz.	83.75
Tin, Straits, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	20.50
No. 120	20.00
No. 123	19.50
80-10-10 ingot	
No. 305	23.50
No. 315	22.00
88-10-2 ingot	
No. 210	25.75
No. 215	24.75
No. 245	21.75
Yellow ingot	
No. 405	16.25
Manganese Bronze	
No. 421	18.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	17.50—17.75
0.60 copper, max.	17.00—17.50
Piston alloys (No. 122 type)	16.25—17.00
No. 12 alum. (No. 2 grade)	16.00—16.75
108 alloy	16.00—16.75
195 alloy	16.75—17.50
AXS-679	16.50—16.75
Steel deoxidizing aluminum, notch-bar, granulated or shot.	
Grade 1—95 pct-97½ pct	16.50
Grade 2—92 pct-95 pct	16.00
Grade 3—90 pct-92 pct	15.50
Grade 4—85 pct-90 pct	15.25—15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	34⅞
Electrodeposited	28⅝
Rolled, oval, straight delivered	29⅛
Curved, 18 in. or longer, delivered	29⅛
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	31⅜
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.	90.00

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz lots, per oz	74.5
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	.0635

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢ 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma, FSa, ¼ in.,54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75. Base quantity, 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢; ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.40
Ribbon, ton lots	14.50
Plates	
Small	13.25
Large, over 12 in.	14.25
Lithographic, ungrained	17.25

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	30.78	....	30.93
Copper, hot-rolled	....	27.28	....
Copper, drawn	....	28.28	....
Low brass, 80 pct	37.52	28.71	29.02
High brass	36.03	27.22	27.53
Red brass, 85 pct	38.03	29.22	29.53
Naval brass	27.50	26.25	32.19
Brass, free cutting	....	22.28	....
Commercial bronze	39.06	30.25	30.56
Manganese bronze	31.07	29.57	35.69
Phosphor bronze, 5 pct	....	49.07	48.82
Muntz metal	27.19	25.94	30.38
Everdur, Herculoy Olympic, etc.	34.45	34.73	35.79
Nickel silver, 5 pct	....	38.11	36.34
Architectural bronze	26.01	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York)

Copper and Brass

(Cents per lb)

No. 1 heavy copper and wire	14¾—15¼
No. 2 heavy copper and wire	13¾—14¼
Light copper	12¼—12¾
Auto radiators (unsweated)	11¼—11¾
No. 1 composition	14 —14½
No. 1 composition turnings	13 —13½
Clean red car boxes	11 —11½
Cocks and faucets	11½—12
Mixed heavy yellow brass	9 — 9½
Old rolled brass	8¾— 9¼
Brass pipe	10¼—10¾
New soft brass clippings	11 —11½
Brass rod ends	9¾—10¼
No. 1 brass rod turnings	10 —10½

Aluminum

(Cents per lb)

Alum. pistons with struts	4½— 5
Aluminum crankcases	7½— 8
2S aluminum clippings	8¼— 8½
Old sheet & utensils	7½— 8
Mixed borings and turnings	3 — 3¼
Misc. cast aluminum	7 — 7½
Dural clips (24S)	6 — 6½

Zinc

(Cents per lb)

New zinc clippings	7 — 7½
Old zinc	5¼— 5¾
Zinc routings	3 — 3½
Old die cast scrap	3 — 3¼

Nickel and Monel

(Cents per lb)

Pure nickel clippings	21 —22
Clean nickel turnings	17 —18
Nickel anodes	19½—20½
Nickel rod ends	20 —21
New Monel clippings	14 —15
Clean Monel turnings	10 —11
Old sheet Monel	12 —12½
Old Monel castings	10 —11
German silver clippings, mixed	10½—11
German silver turnings, mixed	7 — 7¼

Lead

(Cents per lb)

Soft scrap lead	10¾—11
Battery plates (dry)	5¼— 5½

Miscellaneous

(Cents per lb)

Block tin	60
No. 1 pewter	46 —48
No. 1 auto babbitt	36 —37
Mixed common babbitt	12 —12½
Solder joints	13½—14
Siphon tops	38
Small foundry type	16 —16½
Monotype	13½—14
Lino and stereotype	13 —13½
Electrotype	11 —11½
New type shell cuttings (nom.)	12 —12½
Clean hand picked type shells	5½— 6
Lino and stereo dross	6 — 6½
Electro dross	4 — 4½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	15.80
Cut lead sheets	16.30
Lead pipe, manufacturing point	15.05
Lead traps and bends	List +35%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +35%
Drum traps, U.S. list	List +35%
Montclair traps	List +35%
Lead wool	17.05

Openhearth Prices Firm, Specialties Mixed

New York

• • • **The recent series** of openhearth scrap price rises appears to have been definitely halted. How long present prices will hold depends to some extent on weather conditions but the tone of the market this week appears to reflect a tendency to price softness rather than the firmness reflected in the past few weeks.

In Chicago the price of heavy openhearth steel has slipped off 50¢ a ton to $29.50 to $30.00 in the face of heavy consumer resistance. This resistance is also evident in other markets, though turnings and specialties are turning upward in some districts. Isolated sales of various grades are still being reported at fantastically high prices, though not in quantities large enough to establish a market.

No. 1 cupola cast moved up almost $2 a ton in Pittsburgh, though foundries generally were showing firm opposition to higher prices on cast grades. Cast iron borings also staged gains this week in Boston and New York. It will be noted that Detroit prices are now being quoted in THE IRON AGE on the basis of brokers' buying prices, f.o.b. cars.

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PITTSBURGH—Major mills here insist that their buying price on openhearth grades of scrap, delivered to the mill, is $32 to $32.50 but actually some mills are buying in New England and New Jersey and paying freight into this area. This brings the price well above the $32.50 level. A $26 a ton buying price in New England means better than $7.50 freight and an additional 50¢ commission, making the price here greater than $34.00 a ton. The market is fairly stable on the openhearth grades, but prices are fluctuating somewhat on specialties. The railroad's arbitrary price of $32 to $32.50 a ton on railroad heavy melting is inconsistent but forms the market. The prices on scrap rails and specialties are pretty much what the trade will stand, with railroad to mill sales bringing one price and the sales through dealers bringing high prices. No. 1 cupola cast hit $40 to $40.75 a ton here this week, the first time it has touched the $40 mark on general sales. Heavy axle and forge turnings are selling above their normal price in the range with No. 1 and No. 2 heavy melting steel.

CHICAGO—The price of heavy melting is now well stabilized at $30 a ton delivered but two types of contracts remain. One is a flat delivered price and the other is $29.50 plus a 50¢ brokers' commission. Railroad specialties vary widely with the last two lists sold at high prices which large consumers refuse to pay. Rerolling rails which went at $48 are about $12.50 higher than what the large rerolling mills are interested in. This has resulted in the large mills finding they can't buy rails at the moment. Larger foundries have also refused to buy cast at the recent high figure although desperate buyers have taken the few cars offered.

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PHILADELPHIA—Mills in eastern Pennsylvania are more handicapped now by the pig iron shortage than by lack of scrap. One mill had all openhearths closed down last week on that account and expected to continue down this week. The holidays caused scrap to move to mills in limited volume during the week. There were no changes in the going prices although one broker reported a prospective softening trend in the price structure.

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NEW YORK—Markets here were a bit dull early this week as most key executives of scrap firms attended the 19th annual convention of the Institute of Scrap Iron and Steel on Monday, Tuesday and Wednesday. Late last week some improvement in shipments were reported as many of the smaller factors came into a market from which they had been absent for several weeks. Shipments were therefore fairly good with prices tending to show a tendency to softness. Thus more tonnage was moving on the lower side of the spread than on the higher, giving some sources the impression that any, if there were any, substantial price movement would be downward.

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DETROIT—Commencing with the current week, the basis for THE IRON AGE scrap quotations at Detroit has been changed to f.o.b. cars, Detroit. This will bring the Detroit quotations into line with quotations at other scrap centers. No change in market prices has been reported during the past week. Most scrap from industrial plants is moving on allocation as in the past.

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CLEVELAND—Although most major scrap consumers here are out of the market, prices are holding firm and no change seems likely before the weekend, if at all. Despite the good weather, collections are not good and shipments accordingly are nothing to rave about. Higher prices brought by remote scrap are causing some comment in the trade, but local dealers are still working on the short 10-day orders for local consumers. While some sources like to believe the peak of the market is here, the 6 weeks of winter still ahead would seem to preclude much of a break before the end of February, if then.

BOSTON—Snow, ice and lukewarm buyer interest have slowed things. For heavy steel the top is $26 a ton and has been done in a small way, but most mills today balk at $25.50. Gas purifiers heretofore bidding $18.06 for chemical borings now say $21; other users $22. A Worcester mill bought a small lot of machine turnings for $21. Best current bid is $20, and most users say not over $19. Cast generally is tight at $40 to $45, yet a large Boston melter bought a round tonnage at $38.

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BUFFALO—Buying of alloy free machine shop turnings at $23 a ton by one of the leading mill interests during the past week had no particular effect on prices of the light grades, although it was intimated in some trade quarters that a reasonable tolerance for alloy content might be allowed on this business. Shipments in the first week of the new year failed to show much improvement. One yard reported volume in the last week of December was greater, suggesting that the impending freight rate increase was a more potent influence than income taxes.

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CINCINNATI—Prices on all scrap iron and steel are higher though some mills are refusing to pay high prices just to get available supplies. The entire list is trying to move upward with one consumer indicating that No. 1 bundles offered for $35.00 was refused. Dealers and brokers indicate, however, that a slight improvement in the movement of scrap has been noticed, although some withholding, prior to Jan. 1, for tax savings, was indicated. By and large some brokers and dealers feel that prices are rapidly approaching their peak, and that present consumer pressure will prevent any further radical increase.

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BIRMINGHAM—The higher prices yards are paying for scrap is bringing out substantially larger quantities of material here and with year end inventories and tax questions out of the way shipments are expected to show a considerable increase. Truckers, who had disappeared from the scrap market scene during OPA days, are back on the job. Prices on heavy melting steel are holding firm at approximately $10 per ton above the old OPA ceilings.

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TORONTO—Heavy snow and severe winter weather brought movement of scrap iron and steel virtually to a standstill in the Toronto-Hamilton area since the first of the year. Scrap collections and dealers' receipts also practically disappeared and most dealers are snowed in, unable to carry on sorting and shipping operations. For the past month or 6 weeks there has been general slowing in scrap offerings and at the present time the trade is depending almost wholly on industrial scrap, with no supplies available from outside points or western Canada. Steel mills are drawing heavily on stock piles for current needs, while foundries mostly are out of scrap.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Pending establishment of a market in some districts and in certain grades, the former OPA ceiling price is inserted for reference, followed by an asterisk.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.00 to $32.50
RR. hvy. melting	32.00 to 32.50
No. 2 hvy. melting	32.00 to 32.50
RR. scrap rails	34.00 to 34.50
Rails 3 ft. and under	35.50 to 36.50
No. 1 comp'd bundles	32.00 to 32.50
Hand bdld. new shts.	32.00 to 32.50
Hvy. axle turn.	32.00 to 32.50
Hvy. steel forge turn.	31.50 to 32.00
Mach. shop turn.	27.50 to 28.00
Short shov. turn.	29.00 to 29.50
Mixed bor. and turn.	27.50 to 28.00
Cast iron borings	28.50 to 29.00
No. 1 cupola cast	40.00 to 40.75
Heavy breakable cast	30.00 to 32.00
Malleable	38.00 to 39.00
RR. knuck, and coup.	36.50 to 37.50
RR. coil springs	36.50 to 37.50
Rail leaf springs	36.50 to 37.50
Rolled steel wheels	36.50 to 37.50
Low phos.	34.50 to 35.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	29.50 to 30.00
No. 1 bundles	29.50 to 30.00
No. 2 dealers' bndls.	29.50 to 30.00
Bundled mach. shop turn.	29.50 to 30.00
Galv. bundles	27.50 to 28.00
Mach. shop turn.	24.50 to 25.00
Short shovels, turn.	26.50 to 27.00
Cast iron borings	24.50 to 26.00
Mix. borings & turn.	24.50 to 25.00
Los. phos. hvy. forge	33.50 to 36.00
Low phos. plates	32.50 to 35.00
No. 1 RR. hvy. melt.	30.50 to 31.00
Reroll rails	33.50 to 34.50
Miscellaneous rails	33.50 to 34.50
Angles & splice bars	35.50 to 36.00
Locomotive tires, cut	35.00 to 37.00
Cut bolster & side frames	35.50 to 36.00
Standard stl. car axles	35.00 to 36.50
No. 3 steel wheels	33.00 to 35.00
Couplers & knuckles	33.00 to 35.00
Malleable	40.00 to 45.00
No. 1 mach. cast	40.00 to 45.00
Rails 3 ft. and under	37.50 to 40.00
No. 1 agricul. cast	36.00 to 38.00
Hvy. breakable cast	36.00 to 38.00
RR. grate bars	35.00 to 36.00
Cast iron brake shoes	35.00 to 36.00
Stove plate	36.00 to 38.50
Clean auto cast	37.00 to 40.00
Cast iron carwheels	35.00 to 37.50

CINCINNATI

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	$28.50 to $29.00
No. 2 hvy. melting	28.50 to 29.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	28.50 to 29.00
Mach. shop turn.	23.50 to 24.00
Shoveling turn.	24.50 to 25.00
Cast iron borings	23.50 to 24.00
Mixed bor. & turn.	23.50 to 24.00
Low phos. plate	30.50 to 31.00
No. 1 cupola cast	33.00 to 35.00
Hvy. breakable cast	31.00 to 33.00
Stove plate	28.00
Scrap rails	26.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	25.00 to 26.00
Nos. 1 and 2 bundles	25.00 to 26.00
Busheling	25.00 to 26.00
Turnings, shovelings	21.00 to 22.00
Machine shop turn.	19.00 to 20.00
Mixed bor. & turn.	19.00 to 20.00
Cl'n cast. chem. bor.	21.00 to 22.00
No. 1 machinery cast	40.00 to 45.00
No. 2 machinery cast	40.00 to 45.00
Heavy breakable cast	38.00 to 40.00
Stove plate	40.00 to 45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$26.75 to $27.25
No. 2 hvy. melting	26.75 to 27.25
No. 1 bundles	26.75 to 27.25
New busheling	26.75 to 27.25
Flashings	26.75 to 27.25
Mach. shop turn	19.25 to 20.25
Short shov. turn	21.25 to 21.75
Cast iron borings	$20.75 to $21.25
Mixed bor. & turn.	20.25 to 20.75
Low phos. plate	29.25 to 29.75
No. 1 cupola cast	41.25 to 44.25
Charging box cast	40.25 to 43.25
Hvy. breakable cast	37.25 to 39.25
Stove plate	37.25 to 39.25
Automotive cast	nominal

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.50 to $31.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 bundles	30.50 to 31.50
No. 2 bundles	30.50 to 31.50
Mach. shop turn.	23.00 to 24.00
Shoveling turn.	23.00 to 23.50
Cast iron borings	23.00 to 24.00
Mixed bor. & turn.	23.00 to 24.00
No. 1 cupola cast	41.00 to 42.00
Hvy. breakable cast	40.00 to 41.00
Cast. charging box	40.00 to 41.00
Clean auto cast	41.00 to 42.00
Hvy. axle forge turn.	30.50 to 31.50
Low. phos. plate	33.50 to 34.50
Low phos. punchings	33.50 to 34.50
RR. steel wheels	33.00 to 35.00
RR. coil springs	33.00 to 35.00
RR. malleable	35.00 to 40.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$28.25 to $28.75
Bundled sheets	28.25 to 28.75
Mach. shop turn.	23.25 to 23.75
Locomotive tires, uncut	29.00 to 30.00
Misc. std. sec. rails	32.00 to 34.00
Rerolling rails	34.00 to 35.00
Steel angle bars	30.00 to 31.00
Rails 3 ft. and under	35.00 to 36.00
RR. springs	31.00 to 32.00
Steel car axles	30.00 to 31.00
Stove plate	30.00 to 35.00
Grate bars	30.00 to 32.50
Brake shoes	25.00 to 26.00
Malleable	38.00 to 40.00
Cast iron carwheels	32.00 to 33.00
No. 1 mach'ery cast.	35.00 to 40.00
Breakable cast	25.00 to 27.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$27.00 to $27.50
No. 2 hvy. melting	27.00 to 27.50
No. 2 bundles	27.00 to 27.50
No. 1 busheling	27.00 to 27.50
Long turnings	17.00 to 18.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Bar crops and plate	28.00 to 29.00
Structural and plate	28.00 to 29.00
No. 1 cast	34.00 to 38.00
Stove plate	30.00 to 35.00
Steel axles	29.00 to 30.00
Scrap rails	28.00 to 29.00
Rerolling rails	30.00 to 31.00
Angles & splice bars	30.00 to 31.00
Rails 3 ft & under	31.00 to 32.00
Cast iron carwheels	29.50 to 30.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.00 to $32.50
No. 2 hvy. melting	32.00 to 32.50
Low phos. plate	34.00 to 34.50
No. 1 busheling	32.00 to 32.50
Hydraulic bundles	32.00 to 32.50
Mach. shop turn.	26.50 to 27.00
Short. shovel, turn.	26.50 to 27.00
Cast iron borings	27.00 to 27.50
Elec. furnace punch	34.00 to 34.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$25.50 to $26.50
No. 2 hvy. melting	25.50 to 26.50
Comp. black bundles	25.50 to 26.50
Comp. galv. bundles	23.50
Mach. shop turn.	20.50
Mixed bor. & turn.	20.50
Shoveling turn.	22.50
No. 1 cupola cast	$36.00 to 37.00
Hvy. breakable cast	32.00 to 35.00
Charging box cast	$36.00 to $37.00
Stove plate	36.00 to 37.00
Clean auto cast	36.00 to 37.00
Unstrip. motor blks.	25.00 to 27.00
Cl'n chem. cast bor.	22.50 to 23.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$28.50 to $29.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	28.50 to 29.00
No. 2 hvy. melting	28.50 to 29.00
Mach. shop turn.	18.75 to 19.25
Shoveling turn.	20.75 to 21.25
Cast iron borings	19.75 to 20.25
Mixed bor. & turn.	18.75 to 19.25
No. 1 cupola cast	35.00 to 40.00
Charging box cast	30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 40.00
Malleable	33.00 to 33.50
Low. phos. plate	31.00 to 32.00
Scrap rails	29.75 to 30.25
Rails 3 ft. & under	31.75 to 32.25
RR. steel wheels	32.75 to 33.25
Cast iron carwheels	31.00 to 31.50
RR. coil & leaf spgs.	32.75 to 33.25
RR. knuckles & coup.	32.75 to 33.25
No. 1 busheling	28.50 to 29.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.00 to $30.50
No. 2 hvy. melting	30.00 to 30.50
Compressed sheet stl.	30.00 to 30.50
Drop forge flashings	30.00 to 30.50
No. 2 bundles	30.00 to 30.50
Mach. shop turn.	25.00 to 25.50
Short shovel	25.00 to 25.50
No. 1 busheling	30.00 to 30.50
Steel axle turn.	30.00 to 30.50
Cast iron borings	25.00 to 25.50
Mixed bor. & turn.	25.00 to 25.50
No. 1 machinery cast	37.50 to 40.00
Malleable	34.50 to 35.00
Railroad cast	37.50 to 40.00
Railroad grate bars	30.00 to 30.50
Stove plate	34.50 to 35.00
RR. hvy. melting	30.00 to 30.50
Rails 3 ft. & under	34.00 to 34.50
Rails 18 in. & under	36.00 to 36.50
Rails for rerolling	33.00 to 33.50
Elec. furnace punch	32.00 to 32.50

SAN FRANCISCO

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	19.50*
No. 1 cupola cast.	25.00*
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
No. 1 cupola cast	25.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 & No. 2 hvy. melting	$17.00
Elec. furn. 1 ft. und.	17.00
No. 1 cupola cast	25.00*
RR. hvy. melting	16.00

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	22.07	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	22.07	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Ft. Wayne, Titusville	22.99	22.07	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.46	30.30	23.80	24.34	34.62	56.26
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.85
Light rails (from rail steel)	2.75

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	24.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg
Standard, galvanized and coated nails	$3.75
Cut nails, carloads	4.85

	Base per 100 lb
Annealed fence wire	$3.95
Annealed galv. fence wire.	4.40

	Base column
Woven wire fence*	84
Fence posts, carloads	74
Single loop bale ties	86
Galvanized barbed wire**	94
Twisted barbless wire	94

*15½ gage and heavier. **On 80-rod spools in carload quantities.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	4.10	4.10	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled	3.85	3.85	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.75	4.75	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized	.....	5.40	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.85	3.85	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.85	3.85	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	.....	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes	.....	3.85	.....	.....	3.45	3.45	3.45	3.45	.....
Beams	.....	3.85	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	4.00	4.00	3.70	.....	.....	3.70	3.70	3.732†‡	.....
Cold-rolled	.....	.....	.....	.....	.....	.....	.....	4.382†‡	.....
Bar shapes	.....	4.00	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural	.....	.....	.....	.....	.....	.....	.....	$74.65†	.....
Forging	.....	.....	.....	.....	.....	.....	.....	$82.23†	.....

* 21 gage and lighter. † Alloy extras apply. ‡ Add 0.379¢ for forging or heat treating grade.

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb. Prices do not reflect recent price increases or the ICC approved freight rate increases effective Jan. 1.

Cities	SHEETS			STRIP			Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled (10 gage)	Cold-Rolled	Galvanized (24 gage)	Hot-Rolled 6 In. and Under	Hot-Rolled Over 6 In.	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A-8617-20	Hot-Rolled, A-8742-50 Ann.	Cold-Drawn, A-8617-20	Cold-Drawn, A-8742-50 Ann.
**Philadelphia	$3.774	$5.139	$5.249[a]	$4.314	$4.214	$5.064	$3.875	$3.937	$4.114	$4.564	$6.287	$7.387	$7.664	$8.764
New York	3.856	4.869	5.501	4.375	4.275	5.075	4.049	4.038	4.134	4.584	6.338	7.438	7.684	8.784
Boston	4.05	5.031	5.725	4.518	4.418	4.985	4.203	4.023	4.356	4.656	6.503	7.603	7.756	8.856
Baltimore	3.64	5.118	5.365	4.293	4.193	....	3.865	4.05	4.093	4.543	....	....	....	....
Norfolk	4.037	....	5.862	4.577	4.477	....	4.262	4.303	4.377	4.677	....	....	....	....
Chicago	3.475	4.425	5.40	3.95	3.85	4.90[5]	3.80	....	3.75	4.20	6.05	7.15	7.20	8.30
Milwaukee	3.633	4.583	5.558	4.108	4.008	5.058[5]	3.958	3.958	3.908	4.358	6.308	7.408	7.458	8.558
Cleveland	3.575	....	5.347	3.95	3.85	....	3.65	3.88	3.80	4.20	6.277	7.377	7.20	8.30
Buffalo	3.575	4.625	5.20	4.211	4.111	4.961	3.921	3.85	3.80	4.20	6.05	7.15	7.20	8.30
Detroit	3.71	4.76	5.526	4.085	3.985	4.95	3.935	3.987	3.735	4.285	6.456	7.556	7.585	8.685
Cincinnati	3.671	4.721	5.296	4.046	3.946	5.002	3.952	3.983	3.902	4.502	6.441	7.541	7.602	8.702
St. Louis	3.643	4.593	5.622	4.118	4.018	5.222	3.968	3.968	3.918	4.522	6.472	7.572	7.622	8.722
Pittsburgh	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	6.05	7.15	7.20	8.30
St. Paul	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.852	....	6.322	7.952	8.052
Duluth	3.817	4.767	5.666	4.292	4.192	....	4.142	4.142	4.092	....	6.472	6.572	....	....
Omaha	4.045	5.72	6.00	4.52	4.42	....	4.37	4.37	4.32	4.945	....	....	....	....
Indianapolis	3.775	4.825	5.40	4.15	4.05	5.03	3.92	3.92	3.87	4.47	6.17	....	7.32	....
Birmingham	3.675	....	5.20	4.05	3.95	....	3.80	3.80	3.75	4.954	6.414	7.514	7.564	8.614
Memphis	4.221	....	5.746	4.596	4.496	....	4.346	4.346	4.296	4.821	....	....	....	....
New Orleans	4.359*	5.401	5.884	4.734	4.634	....	4.484	4.484*	4.434*	5.175	....	....	....	....
Los Angeles	4.885	6.635[1]	6.585	5.335	5.235	....	4.835	4.735	4.685	6.065	....	....	....	....
San Francisco	4.435	6.035	6.585	4.885	4.785	....	4.535	4.385	4.435	5.815	....	....	....	....
Seattle	4.905[4]	7.305[2]	6.435	4.635	4.535	....	5.035[4]	4.735[4]	4.635[4]	6.265	7.735[6]	8.735[6]	....	9.585[6]
Portland	4.905[3]	....	6.235	5.135	....	....	5.035[3]	4.735[3]	4.735[3]	6.015	7.735	8.885	....	....
Salt Lake City	4.81	....	6.70	5.94	5.84	....	5.29	5.29	5.19	6.49	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb and over.

([a]) Philadelphia: Galvanized sheet, 25 or more bundles.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not reflect the ICC freight rate increase effective Jan. 1.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)						
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	31.00	31.50	32.00	32.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	31.00	31.50	32.00	32.50	36.00	Boston	Birdsboro-Steelton	4.47	.....	.....	.....	.....	40.47
Birmingham	26.38	26.88	.....	.....	.....	Brooklyn	Bethlehem	2.78	33.78	34.28	34.78	35.28	.....
Buffalo	30.00	30.50	31.00	31.50	.....	Brooklyn	Birdsboro	3.26	.....	.....	.....	.....	39.26
Chicago	30.00	30.50	30.50	31.00	.....	Canton	Clev., Ygstn., Sharpsville	1.54	31.54	32.04	32.04	32.54	.....
Cleveland	30.00	30.50	30.50	31.00	.....	Canton	Buffalo	3.55	.....	.....	.....	.....	.....
Detroit	30.00	30.50	30.50	31.00	.....	Cincinnati	Birmingham	4.30	30.68	31.18	.....	.....	.....
Duluth	30.50	31.00	31.00	31.50	.....	Cincinnati	Hamilton	1.24	.....	.....	29.74	.....	.....
Erie	30.00	30.50	31.00	31.50	.....	Cincinnati	Buffalo	4.89	.....	.....	.....	.....	.....
Everett	29.00	29.50	30.00	30.50	.....	Jersey City	Bethlehem	1.70	32.70	33.20	33.70	34.20	.....
Granite City	30.00	30.50	30.50	31.00	.....	Jersey City	Birdsboro	2.16	.....	.....	.....	.....	38.16
Hamilton	28.00	28.50	28.50	.....	.....	Los Angeles	Provo	5.25	35.25	35.75	.....	.....	.....
Neville Island	30.00	30.50	30.50	31.00	.....	Los Angeles	Buffalo	16.33	.....	.....	.....	.....	.....
Provo	30.00	30.50	.....	.....	.....	Mansfield	Cleveland-Toledo	2.16	32.16	32.66	32.66	33.16	.....
Sharpsville	30.00	30.50	30.50	31.00	.....	Mansfield	Buffalo	3.74	.....	.....	.....	.....	.....
Sparrows Point	31.00	31.50	.....	.....	.....	Philadelphia	Swedeland	0.93	31.93	32.43	32.93	33.43	.....
Steelton	31.00	.....	.....	.....	36.00	Philadelphia	Birdsboro	1.38	.....	.....	.....	.....	37.38
Swedeland	31.00	31.50	32.00	32.50	.....	San Francisco	Provo	5.25	35.25	35.75	.....	.....	.....
Toledo	30.00	30.50	30.50	31.00	.....	San Francisco	Buffalo	16.33	.....	.....	.....	.....	.....
Youngstown[1]	30.00	30.50	30.50	31.00	.....	Seattle	Provo	5.25	35.25	35.75	.....	.....	.....
						Seattle	Buffalo	16.33	.....	.....	.....	.....	.....
						St. Louis	Granite City	0.50 Arb.	30.50	31.00	31.00	31.50	.....
						St. Louis	Buffalo	7.86	.....	.....	.....	.....	.....

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base price for low phosphorous $37.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $42.99. High phosphorous charcoal pig iron is not being produced.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson Ohio—$36.00; f.o.b. Buffalo—$37.25. Add $1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe)
Base price—$200.00 per net ton

	Black	Galv.
Steel (buttweld)		
½-in.	55½	41
¾-in.	58½	45
1-in. to 3-in.	60½	47½
Wrought Iron (buttweld, standard)		
½-in.	2	+20
¾-in.	11½	+10
1-in. and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel (lapweld, standard)		
2-in.	53	39½
2½-in. and 3-in.	56	42½
3½-in. to 6-in.	58	44½
Wrought Iron (lapweld)		
2-in.	14½	+ 5½
2½-in. to 3½-in.	17	+ 1½
4-in.	21	4
4½-in. to 8-in.	19	2½
Steel (butt, extra strong, plain ends)		
½-in.	54½	41½
¾-in.	58½	45½
1-in. to 3-in.	60	48
Wrought Iron (same as above)		
½-in.	6½	+14
¾-in.	12½	+ 8
1-in. to 2-in.	22	2
Steel (lap, extra strong, plain ends)		
2-in.	52	39½
2½-in and 3-in.	56	43½
3½-in. to 6-in.	59½	47
Wrought Iron (same as above)		
2-in.	17½	+ 2
2½-in. to 4-in.	26	8½
4½-in. to 6-in.	22	4

Basing discounts for standard pipe and reamed and drifted pipe are for threads and couplings. For threads only, one point higher discount (lower price) applies; for plain ends, buttweld and lapweld 3 in. and smaller, two points higher discount (lower price) applies, while for lapweld 3½ in. and larger three points higher discount (lower price) applies.

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Seamless Hot-Rolled
2 in. O.D. 13 B.W.G.	$18.17	$15.29
2½ in. O.D. 12 B.W.G.	24.43	20.57
3 in. O.D. 12 B.W.G.	27.18	22.87
3½ in. O.D. 11 B.W.G.	34.30	28.86
4 in. O.D. 10 B.W.G.	42.55	35.82

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft to 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	$74.33
6-in. to 24-in., del'd New York	73.60
6-in. to 24-in., Birmingham	65.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	88.40

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	55
9/16 & ⅝ in. x 6 in. & shorter	52
¾ to 1 in. x 6 in. & shorter	49
1⅛ in. and larger, all lengths	49
All diameters over 6 in. long	49
Lag, all sizes	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed
(Hexagon or Square)

½ in. and smaller	50
9/16 to 1 in. inclusive	49
1⅛ to 1½ in. inclusive	48
1⅝ in. and larger	46

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts *Base discount less case lots*	U.S.S.	S.A.E.
7/16 in. and smaller	..	51
½ in. and smaller	50	..
½ in. through 1 in.	..	49
9/16 in. through 1 in.	49	..
1⅛ in. through 1½ in.	48	47
1⅝ in. and larger	46	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts loose	60 and 10
In packages, nuts attached	67 and 52
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets
(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets
(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws *(In packages)*

	Percent Off List Consumer
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in x 6 in.	59
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.45
Old range, non-bessemer	5.30
Mesabi, bessemer	5.20
Mesabi, non-bessemer	5.05
High phosphorus	5.05

Iron ore exempt from price control by SO 193 effective Nov. 10, 1946.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 375 mesh	28⅝¢ to 30⅝¢
Copper, reduced, 150 and 200 mesh	22⅜¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	6¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	29¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	17.55¢ to 21.05¢
Manganese, minus 325 mesh and coarser	44¢ to 61¢
Nickel, 150 mesh	51½¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$8.75
Connellsville, Pa., hand drawn	9.35
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.62
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads Per 1000
Sec. quality, Ohio	57.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio	65.00
First quality, New Jersey	70.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	59.00
Sec. quality, New Jersey	62.00
Sec. quality, Ohio	57.00
Ground fire clay, net ton, bulk	9.50

Silica Brick

Pennsylvania and Birmingham	$65.00
Chicago District	74.00
Silica cement, net ton (Eastern)	11.50
Chicago	12.50

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa.	10.05
Midwest, add 10¢; Mo. Valley, add 20¢	

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6 (14) Billets only.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars [10]	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00	$52.00				$52.00	(Bethlehem, Massillon, Canton, Coatesville=$52.00)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00				$54.50[14]	$44.50		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00					$62.50[14]	$52.50		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton=$61.00)						$63.50		
SHEET BARS	$38	$38		$38		$38	$38	$38	(Canton=$38)						
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢	(Coatesville=2.05¢)						
WIRE RODS [15]	2.55¢	2.55¢		2.55¢	2.55¢	(Worcester=2.65¢)					2.635¢	3.385¢			
SHEETS															
Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢		3.085¢	2.635¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢			3.885¢	3.335¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢	3.55¢	3.55¢	3.65¢			4.135¢		3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢			4.235¢	3.685¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢									4.335¢		3.95¢	3.91¢
STRIP															
Hot-rolled [3]	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢			2.50¢		3.185¢	2.635¢	2.93¢	2.83¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester=3.75¢)			3.335¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							4.09¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85					$6.157	$6.062[11]
Electro, box 0.25 lb	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb	Deduct 50¢ from standard coke base box price.														
BLACKPLATE 29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢					3.99¢	3.90¢
TERNES, MFG. Special coated, base box	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	(Duluth=2.70¢) (Provo, Utah=3.30¢)			2.985¢	3.285¢	2.735¢	3.01¢	2.98¢
Rail steel [6]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢					3.135¢	3.435¢			
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢			2.835¢	2.885¢	2.585¢	2.74¢	2.79¢
Reinforcing (rail) [7]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢				2.985¢	3.035¢	2.735¢		
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	(Detroit=3.25¢, Toledo=3.35¢)							3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton=3.05¢)					3.185¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.765¢		
PLATE								(Coatesville, Claymont=2.80¢, Geneva, Utah=2.65¢)							
Carbon steel [13]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	2.65¢			3.035¢	3.235¢	2.905¢	2.87¢	2.708¢
Floor plates	3.90¢	3.90¢									4.285¢	4.585¢		4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville=3.79¢)						4.305¢	4.525¢		4.01¢	3.895¢
SHAPES Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah=2.65¢) (Bethlehem=2.50¢)				2.885¢	3.185¢		2.70¢	2.64¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.55¢			3.55¢			(Worcester=3.75¢)								
0.51 to 0.75 carbon	4.80¢			4.80¢			(Worcester=5.00¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester=6.85¢)								
1.01 to 1.25 carbon	8.85¢			8.85¢			(Worcester=9.05¢)								
WIRE [9]															
Bright [12]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester=3.40¢, Duluth=3.35¢)					3.835¢		3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢			(Worcester=4.40¢)			(Trenton=4.50¢)		4.785¢		4.66¢	4.345¢
PILING															
Steel sheet	3.00¢	3.00¢				3.00¢						3.585¢		3.41¢	3.36¢

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.40	6.65	7.20
Ton lots	7.30	7.90	9.80
Less ton lots	7.70	8.30	10.20

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$39.00	$40.00
F.o.b. Pittsburgh, Chicago	44.00	

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.45
Ton lots	7.40
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.15
Ton lots	7.05
Less ton lots	7.45

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $53.25 f.o.b. Keokuk, Iowa; $50.00 f.o.b. Jackson, Ohio; $51.25 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	14.65	16.90	18.65
97% Si, 1% Fe	15.05	17.30	19.05

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb briquets.

	Eastern	Central	Western
Carload, bulk	3.85	4.10	4.30
Ton lots	4.75	5.35	5.65
Less ton lots	5.15	5.75	6.05

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.45	7.95	8.15
75% Si	9.25	9.55	10.30
80-90% Si	10.45	10.75	11.50
90-95% Si	12.05	12.35	13.05

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr, 4-6% C, 6-9% Si	16.60	17.00	17.15

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.60	$2.35 $2.95
Less ton lots	1.95	2.70 3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	13.50	14.60	16.55
Less ton lots	14.25	15.35	17.30

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14.50¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.85¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.50¢
Ton lots	9.25¢
Less ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound of alloy.

Carload lots	35¢
Ton lots	37¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

House Special Committee Issues "Economic Primer for 1947"

Washington

• • • **In sharp contrast** with the procrustean CIO-Nathan report and the generalized but sensible report of the Council of Economic Advisers is the swan-song report of the House Special Committee on Postwar Economic Policy and Planning. This committee, created by an Administration Congress in 1944, has issued a well documented study which might well be titled "An Economic Primer for 1947."

The bi-partisan efforts of this Committee were sometimes overshadowed by other Congressional groups which produced more sensational news, but its staff, headed by Marion B. Folsom, treasurer of the Eastman Kodak Co., was the envy of Capitol Hill. Its 11 reports on various economic problems have been uniformly well-received.

Recognizing the importance of management-labor problems in the current maze of economic maladjustments the report unequivocally states that "the greatest contribution to the solution of these problems can be made by an increase in productivity of all factors of production which would both reduce costs and increase supplies."

In regard to a possible business recession in the coming months, the committee, in a spirit of humility noticeably absent from many similar reports, states that it "does not feel itself able to judge at the moment whether the present maladjustments are such as to presage a general business decline or whether readjustment in specific lines will occur as they have over the past year, one problem following another but without bringing any general retardation."

Considering everything, the committee feels that there is no necessity for either a depression or recession. According to the report, "the country has the greatest buying power and the greatest pent-up demand for consumer products in its history. Loose talk of depressions and business recessions is unjustified and serves no good purpose. There is nothing wrong with the country that hard work and resultant production will not cure."

The committee in its assignment was primarily concerned with economic problems of the immediate postwar period. It has, therefore, not studied those problems relating to the reduction of the wide swings in business activity that have been experienced in the past. However, conceding the seriousness of these problems, the report recommends that a permanent overall economic policy committee be set up in each House of Congress with adequate joint staff to conduct a long-range study of this subject or that the Joint Committee for the President's Economic Report be implemented to do this work. Such a committee would work in close cooperation with both the President's Council of Economic Advisers and the executive agency which the committee recommends replace OWMR. These studies would be directed primarily at the effect which government policy has on these business swings.

While acknowledging the need for certain governmental activities, such as unemployment insurance, proper scheduling of public works, and the proper handling of social security funds, which would have to be carried on even if the country is to remain perfectly free from economic depressions, the committee clearly states:

".... Our experience to date points to the conclusion that the government cannot and should not take *full* responsibility for maintaining economic stability or full employment. Such a government could neither accomplish its purpose nor remain a democracy. We were able to mobilize our economy for war only by surrendering temporarily the basic democratic free-

Alloy Steel Rods Replace Strings in 3-Octave Piano

DETAILS of a miniature piano which created considerable interest upon its appearance in THE IRON AGE (Aug. 8, 1946, p. 108) are shown here. At left, the center gated base casting, diecast in No. 13 aluminum alloy, and the low-pressure mat-molded plastic case. The supports, shown on the piano at right are ¾-in. steel, welded assembly. The inventor, Harold Rhodes, of Hollywood will market the unit. R. H. Osbrink Mfg. Co., Los Angeles, is the manufacturer.

doms which we were fighting the war to preserve. We should not be misled by those who urge that we can equally well 'mobilize' for full employment in peacetime. To do so would be to accept totalitarianism—which we fought to prevent having imposed on us."

Specifically, the committee's major findings and recommendations are:

MACHINERY OF GOVERNMENT IN ITS EFFECT ON ECONOMIC POLICY—The committee recommends the continuation of a Presidential agency to act as a sort of overall general staff to coordinate the formulation and execution of policy. It feels that the function of OWMR has shown both the needs and the difficulties of such an agency. According to the report, the primary weakness of OWMR has been its devotion to the settling of jurisdictional appeals, of trouble-shooting after policy had been mishandled, rather than staff anticipation on an advance basis of planning where the need of common action between several departments was manifest.

The immediate establishment of a War Resources Board is also urged to insure civilian control of the economy in wartime. Such a board would be established with a skeleton personnel and an adequate reserve subject to immediate call on the same basis as a military reserve.

Convinced of the need for cooperation between the executive and legislative branches at a time when party control of Congress differs from that of the Presidency, the Committee also recommends the broadening of the Joint Committee on the Economic Report of the President or the creation of committees in each House to carry on such work. These recommendations are referred to above.

CONTRACT TERMINATIONS AND SETTLEMENTS—With this job practically 100 pct complete, the committee gives the Office of Contract Settlement a well-deserved pat on the back. No recommendations are made.

SURPLUS PROPERTY AND PLANTS—The Committee expresses disappointment with the progress of disposal programs. The reasons for the delay, advanced in the report, are: (1) Size of the task; (2) the fact that large quantities of surplus goods must be disposed of with a minimum of dislocation to the economy, and (3) the constant reorganizations of the agencies responsible for the job.

However, the committee places the major share of the responsibility on the cumbersome surplus property act passed by Congress, with its restrictive priority provisions. The committee fully agrees with a recent statement of WAA Chief Robert Littlejohn that "the law is too complicated to permit the disposal of surpluses in a business-like way."

The committee found that much of the criticism of inefficiency, favoritism, and fraud has been exaggerated, but points out that there are many justifiable criticisms involving methods and procedures, which are recognized by WAA.

Congress is further criticized for its negative approach and threats of additional restrictive legislation. It is recommended that the surplus property be completely overhauled, with simplification the immediate objective, giving the Administrator broad discretionary powers and permitting WAA to use its own judgment in matters of detail.

The committee also recommends that: (1) Recognition be given to the urgency for speed in disposing of surplus goods while the current sellers' market exists; (2) that the owning agencies declare their surpluses to WAA immediately; and (3) that OWMR be given the necessary powers to investigate the property now owned by the various agencies and to expedite the declaration of surpluses.

EMPLOYMENT AND UNEMPLOYMENT—Satisfaction is expressed with regard to the present high level of employment. However, the committee recognizes that production in several important industries is still considerably below the rate to be expected from this level of employment. Here again, the committee emphasizes the need for increased production per man-hour is increase in wage rates and materials costs are to be offset.

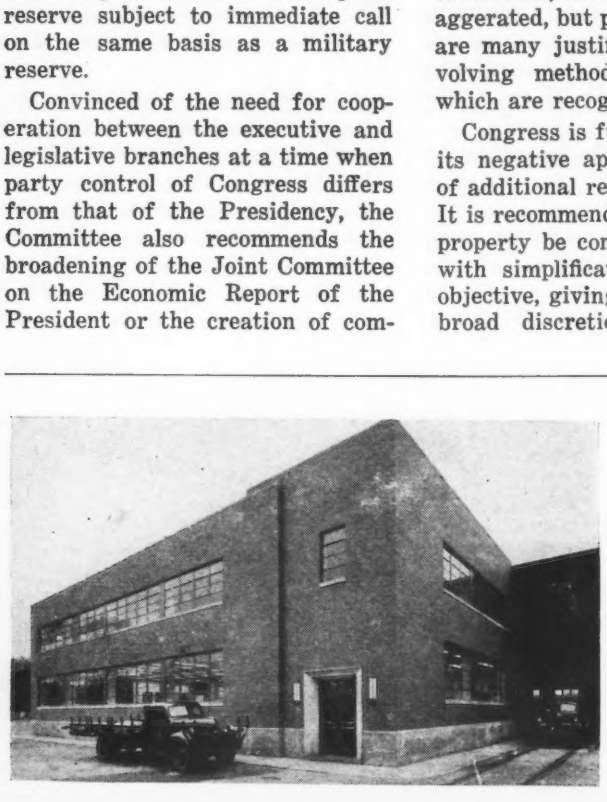
While the committee is confident that serious unemployment can be avoided during the next year or two, it is aware that the country will face a more difficult task when deferred demands are met.

The committee is also aware of the importance of unemployment compensation as an aid to minimizing a decline in employment. It is recommended that additional states take steps to liberalize their benefits both in amount and duration and that the coverage be extended, especially to employees of small firms.

An earlier recommendation that the federal old-age and survivors insurance system be extended to cover the several groups numbering about 12,000,000 now excluded is repeated.

PUBLIC WORKS AND CONSTRUCTION—With the dropping of the rigid controls that characterized the initial phase of the housing program, the committee believes that residential construction will now proceed satisfactorily.

As the committee pointed out in a previous report, construction is too small a factor to be successfully used to stabilize the entire economy, but concerted efforts should be made to stabilize the construction industry. It therefore recommended that public construction be limited during this period of active private construction to projects of



o o o

NEW OFFICE: *Among the most modern and best laid out small office buildings in the Pittsburgh district is this recently completed structure at the Pittsburgh steel service plant of Joseph T. Ryerson & Son.*

o o o

mmediate necessity, but at the ame time plans and specifications e drawn up in advance of need by ublic agencies—federal, state, and ocal—so that the public programs an be expanded as private ones lacken.

Congress has appropriated $65 million to be used for advances to tate and local governments to assist them in making advanced plans.

The committee reports good progress in the preparation of drawings and specifications. Plans are completed for projects amounting to slightly less than $2 billion. It seems evident, nonetheless, according to the report, that the more or less permanent shelf of public works ought to be much larger. The committee, therefore, recommends that the balance of $150 million originally recommended be appropriated for this purpose. Funds will also be needed to enable the agencies of the federal government to prepare the plans and specifications for the projects already authorized by Congress.

FEDERAL BUDGET AND TAX POLICY—The committee strongly urges that additional efforts be made to reduce expenditures during the remainder of the fiscal year so that the budget can be brought into balance and a surplus created. The committee feels that expenditures for the fiscal year ending June 30, 1948, can be reduced to $30 billion without interfering with national defense and the normal functions of government, and that a further substantial reduction can be made during the following year.

In addition to holding federal expenditures down to a minimum consistent with a proper functioning of government, the committee believes that it is necessary to develop a tax system which will raise the necessary revenue and still distribute the tax burden in a manner that will provide adequate incentives for venture capital, creative effort, and business growth, and also permit expansion in consumer demand. According to the report, the personal income tax should be regarded as the main reliance for federal tax revenues and in view of the large revenue requirements, it should be continued on a broad base and with rates well above prewar levels but substantially below wartime peaks.

The committee recommends that

(CONTINUED ON PAGE 138)

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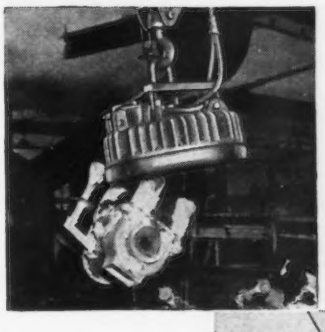
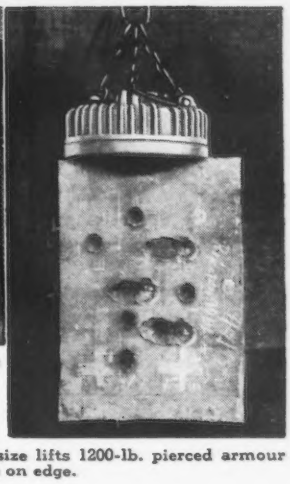


25-inch Magnet lifts heavy die-blanks on and off surface grinder.



29R size lifts 1200-lb. pierced armour plate on edge.

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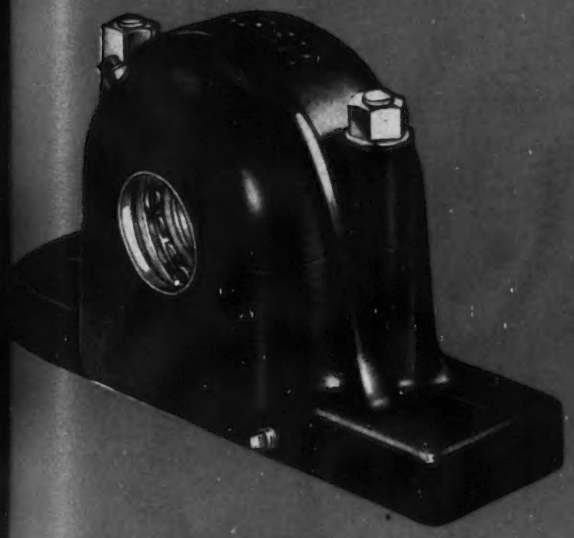

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ake mounting easier and lose less production time . . provide longer life with less attention. They are niversally adaptable to line shafting and machine stallation, dimensionally interchangeable with other andard makes. In straight bore or adapter types. wo or four bolt design. Equipped with the new hafer "Z"-housing seal that keeps lubricant in and irt out. Equipped with the famous Shafer self-con-ined self-aligning DE-22000 Series bearing. They ve no equal.

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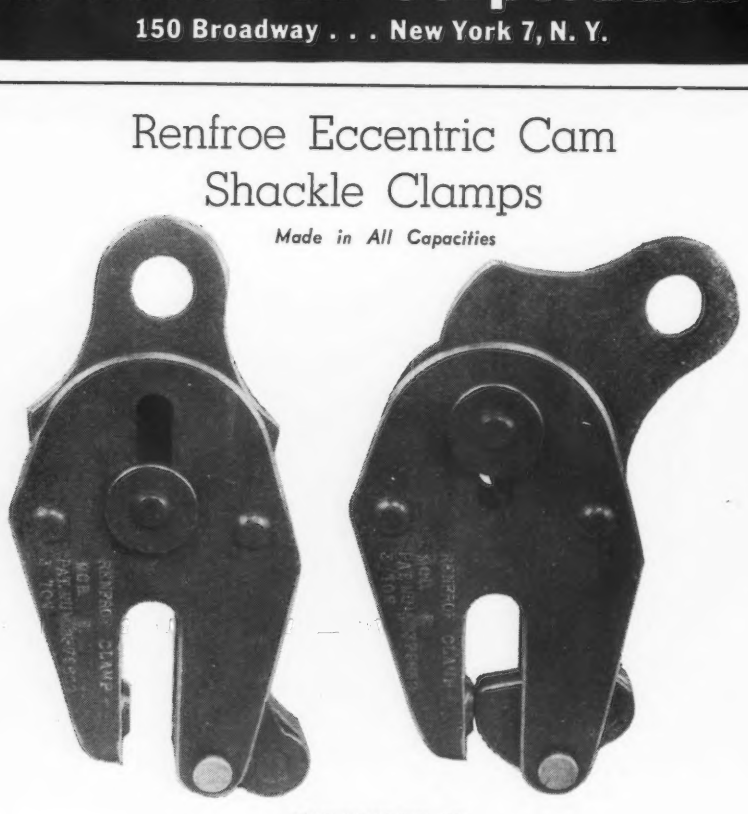

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(CONTINUED FROM PAGE 135)

future issues of state and local governments be made fully taxable; that, as conditions permit, corporate income taxes be reduced; that further consideration be given to elimination of double taxation of dividends, that averaging of incomes for tax purpose be permitted, and that excise taxes be kept to a minimum.

MONETARY AND FISCAL PROBLEMS—The committee urges the government to take the determining part in combating postwar inflationary forces by reversing the mechanism of war finance—taking in more than it pays out—and thus reducing private income available for spending. Retention of savings bonds to maturity and the purchase of new bonds should be vigorously promoted even to the extent of altering certain provisions to make them more attractive. State and local governments are urged to assist by holding down expenditures less urgently needed and postponing as much public works construction as possible.

FOREIGN ECONOMIC POLICY—If economic stability is achieved at home, if the United States continues to advocate the international economic policies which have been already embarked on, the committee maintains that there are good reasons to believe that a high and stable level of international trade can be achieved despite the political and economic uncertainties which confront us in a large part of the world.

The committee recommends to the Congress a hearing to determine in what manner the use of either lend-lease credits or a percentage return of the interest and principal on our postwar loans may be devoted to increasing the imports of strategic materials for stockpiling. An inquiry should also be made into this method of securing repayment of some of our foreign loans to countries with large mineral assets in the interests of both our national defense and of the national economy.

The committee previously recommended that the foreign economic service be made more attractive as a career. While improvement was made by recent legislation, further action is urged to recruit and maintain the highest class of representatives abroad.

10,000 TRADE NAMES

(CONTINUED FROM PAGE 68)

hard; low specific weight, chemically inert. Carborundum Co., Niagara Falls, N. Y.

Durichlor: Cast alloy with 14 Si, 3 Mo, bal. Fe; for pumps, valves, fans to resist HCl. Duriron Co., Inc., 450 N. Findlay St., Dayton.

Durimet: Heat and corrosion-resistant alloys with high nickel-chrome and Si-Mn-Cu for ventilation ducts and chemical apparatus. pickling tanks, valves. Duriron Co., Inc., Caxton Bldg., Dayton.

Durimet: Series of nickel corrosion resistant steels for chemical apparatus, valves, pumps, kettles. Duriron Co., Inc., Scott & Spofford Sts., Dayton.

Durimet 20: Low-carbon austenitic stainless steel with excellent resistance to sulfuric acid. Duriron Co. Inc., Dayton 1.

Durimet T: Low-carbon austenitic stainless steel containing nickel, chromium, molybdenum and copper; unattacked by sulfuric acid. Duriron Co. Inc., Dayton 1.

Duriron: Cast iron with 14.5 Si for insoluble anodes, agitators, crucibles, evaporators. Duriron Co., Inc., Scott & Spofford Sts., Dayton.

Duriron: High-silicon cast iron containing 14½ Si; castings only; machinable by grinding; for most acids except oleum, sulfurous and hydrofluoric. Duriron Co. Inc., Dayton 1.

Duritas: Cemented-carbide drawing, swaging. drawing, extrusion and cold-heading dies. Austin Edwards, Ltd., Warwick, England.

Duro: Acid-proof construction materials. Electro-Chemical Supply & Engrg. Co., Wedge Bldg., Paoli, Pa.

Duro Antifriction Metal: Babbitt for bearings, bushings. Federal Mogul Corp., 11031 Shoemaker St., Detroit.

Durobrite: High-grade zinc with small percentage of magnesium; for zinc plating. E. I. duPont de Nemours & Co., Inc., Wilmington 98, Del.

Durock: Hammer board made up of straight grain, durable rock maple. Irwin Mfg. Co., Inc., Garland, Pa.

Durocyl: Centrifugally-cast hardened cast iron for cylinder liners. Midland Motor Cylinder Co., Birmingham, England.

Durode: High-conductivity alloy for spot welding electrodes. Thos. Bolton & Sons, Widnes, England.

Duro-Gloss: A 13 Cr stainless steel for bolts, nuts, screws, spindles, bushings. Jessop Steel Co., Washington, Pa.

Duro Gloss: Stainless and corrosion resisting steel with 0.12 C, 15 Cr for machine parts, turbine blades, steam fittings. Jessop Steel Co., Washington, Pa.

Duronze: 97-2 bronze with 1 Sn for general use, bolts, cable, hardware, cap screws. Bridgeport Brass Co., Bridgeport, Conn.

Duronze: Corrosion-resistant copper alloys with 2-3 Si and Al for hardware, tanks, vats, gears, pinions. Bridgeport Brass Co., Bridgeport, Conn.

Dur-ristor: Durable, unbreakable, light weight resistor for mill and heavy duty service.

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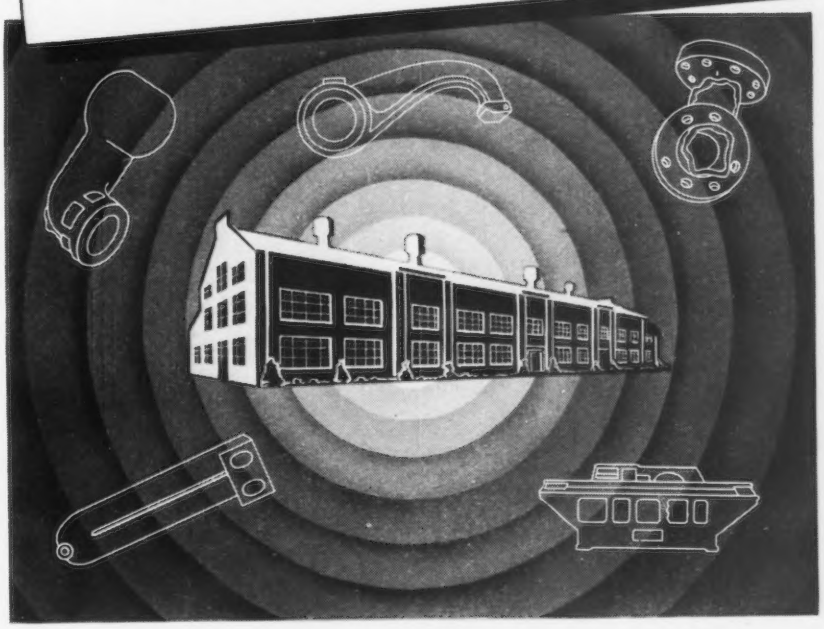

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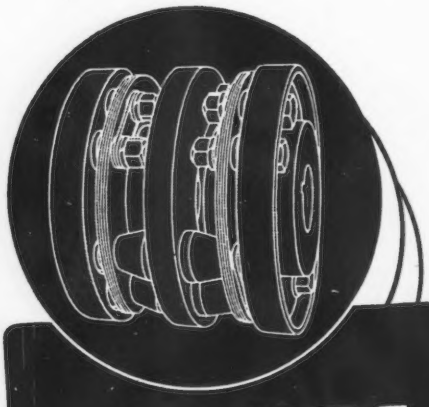
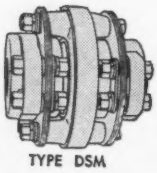


TYPE DBZ



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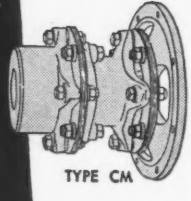
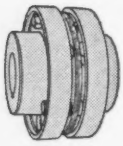


TYPE CM



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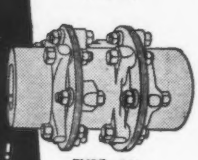
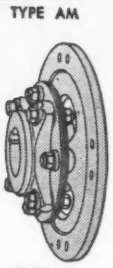


TYPE AM

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.



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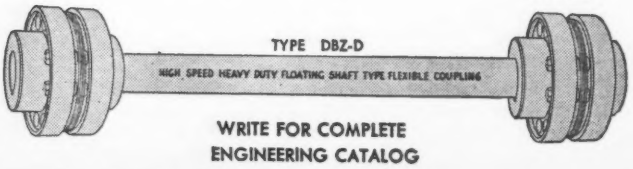

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THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

10,000 TRADE NAMES

Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1.

Dustcote: Arcwelding electrode for steel; corresponds to AWS E-4510. Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14.

Dustfoe: Respirators for protection against dusts and mists. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Dustube: Dust collecting equipment using cloth bag type filters for arresting any dry free-flowing dust. American Foundry Equipment Co., Mishawaka, Ind.

Dutch Boy: Pb-Sn-Sb-Cu babbitt for bearings. National Lead Co., 111 Broadway, New York.

Dutrax: Plain-carbon steel for machinery parts. Duke Steel Co., Inc., 101 Beekman St., New York.

Duxbak: Special tanned flat leather belts; lace leather and waterproof cement. Chas. A. Schieren Co., 30-38 Ferry St., New York 7.

DX Gas: Prepared gas atmosphere for bright annealing low-carbon steel and nonferrous metals. Surface Combustion Corp., Toledo 1.

DyCast: Complex steel which resists heat checking; for die-casting dies. Latrobe Electric Steel Co., 40 W. 40th St., New York.

Dylasta: Electric high tungsten-chromium steel for hot and cold stamping dies, bolt dies, extruded dies. Thos. Firth & John Brown, Ltd., Sheffield, England.

Dymal: High-carbon Mn-Cr-V-Mo and Mn-Cr-W-V steels for general use. Amalgamated Steel Co., 7835 Broadway, Cleveland.

Dymonhard: Heat and corrosion-resistant hard-facing electrodes. Dymonhard Corp. of America, 250 W. 57th St., New York.

Dynamo: Silicon-iron magnetic core material. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Dynatrol: High-speed device performing the function of accurately interrupting the charging current to the reactor **without arc**, thus eliminating contactor maintenance problems on electromagnetic, stored-energy resistance-welding equipment. Sciaky Bros., 4915 W. 67th St., Chicago 38.

Dynelec: Si steel for armatures, electric motors and generators. Empire Sheet & Tin Plate Co., Mansfield, Ohio.

Dynetric: Machine for dynamic balancing of machine components such as spindles, bearings, clutch parts, gears. Westinghouse Electric Corp., East Pittsburgh; Gisholt Machine Co., 1253 E. Washington Ave., Madison 3, Wis.

Dy-Prest: Steel and aluminum forgings which are hot forged by hydraulic pressure in closed dies to required shapes. Jos. Dyson & Sons, Inc., 5125 St. Clair Ave., Cleveland 14.

Durite: Silicon-carbide abrasive. Clover Mfg. Co., Norwalk, Conn.

Durundum: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

E

E Alloy: Aluminum alloy with 20 Zn, 3 Cu, Si-Mg-Mn-Fe; for light-weight structural applications. National Physical Laboratory, Teddington, England.

10,000 TRADE NAMES

Eagle Music Wire: Plain carbon steel for wire, springs. Washburn Wire Co., Phillipsdale, R. I.

Ear Defenders: For reduction of nuisance and unavoidable industrial noise. Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Eastern: Series of heat resistant and stainless cast iron for rabble arms, pump parts, furnace parts, annealing boxes, glass industry, stainless castings. Eastern Malleable Iron Co., 2734 Tenyson St., Cleveland.

Easy-Flo: Low-temperature silver brazing alloy with medium silver content; joins ferfous and nonferrous metals. Handy & Harman, 82 Fulton St., New York 7.

Easy Flow: Silver soldering flux. Handy & Harmon, 80 Fulton St., New York 7.

Easy Lift: Hand life truck. Yale & Towne Mfg. Co., 4532 Tacony St., Philadelphia 24

Easy Weld: Series of arcwelding electrodes for steel. Universal Power Corp., 735 Carnegie Ave., Cleveland 15.

Eatonite: Long-wear, Cr-Ni-W-Co, valve-facing alloys; retains hardness and resists corrosion at 1000°F. Eaton Mfg. Co., Wilcox Rich Div., 9771 French Road, Detroit.

Ebonol: Alkaline oxidizing solution giving black finish to copper, copper alloys, zinc and zinc alloys or as paint or enamel base. Enthone Co., 442 Elm St., New Haven 2, Conn.

Ebonol "C": Chemical blackening process for copper alloys with less than 35 pct Zn; 2 to 10-min immersion in solution at 200° to 212°F. Enthone Co., Inc., 442 Elm St., New Haven 11, Conn.

Ebonol-Z: Immersion blackening process for zinc or zinc alloys; jet black after 1 to 5 min at 150° to 212°F. Enthone Co., Inc., 442 Elm St., New Haven 11, Conn.

Eclipsaloy: Series of brasses for pistons, cylinder heads, hydraulic castings, pressure-tight castings. Eclipse-Pioneer Foundries, Teterboro, N. J.

Economax: Radical drills, sensitive drills, upright drills and jig borers. Fosdick Machine Tool Co., Cincinnati 23.

Economet: High-carbon austenitic stainless steel for heat and corrosion-resistant parts. General Alloys Co., 401 West First St., Boston.

Economo: Molybdenum-bearing steel for shafts, spindles, gears, pinions. Wheelock, Lovejoy & Co., Cambridge, Mass.

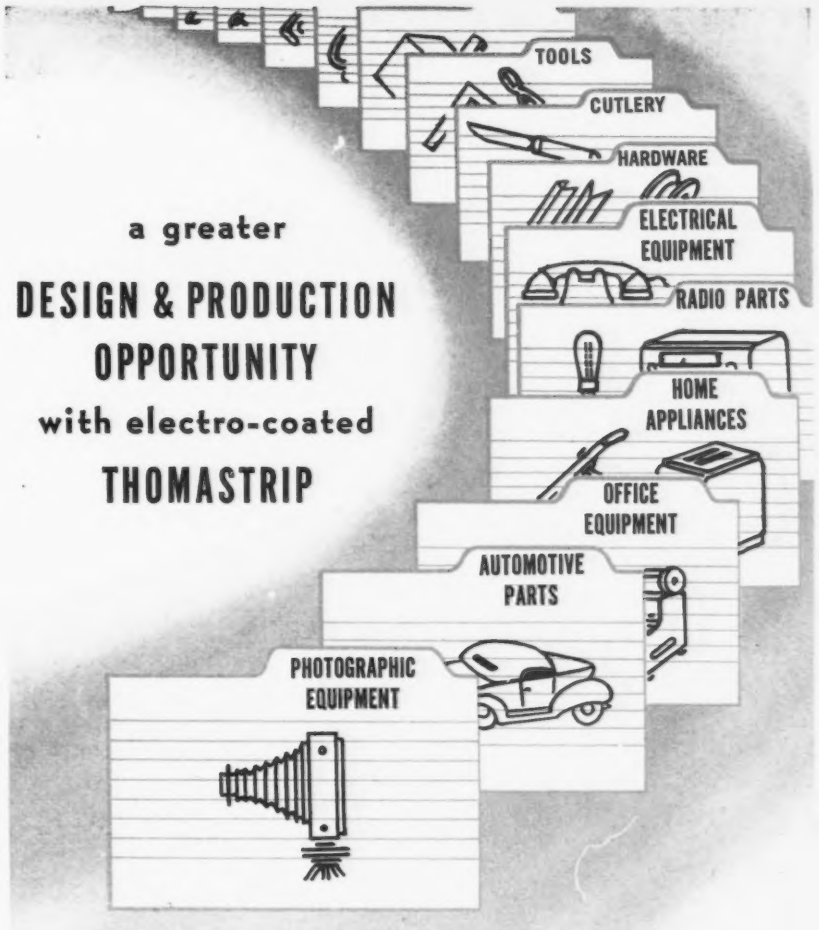
Economy: Buffing fabric. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Economy: Narrow-faced brushing wheels that can be mounted directly on an arbor or a set of sections mounted together in an interlocking hub. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.

Economy: Special hardfacing welding electrodes. American Manganese Steel Div. of American Brake Shoe Co., Chicago Heights, Ill.

Economy Boiler Baffles: Speecially designed refractory construction to route gases through boiler tubes so as to develop maximum boiler capacity and efficiency. Ramtite Co., 2563 W. 18th St., Chicago 8.

Economy Hardface: Air-hardening hard-facing



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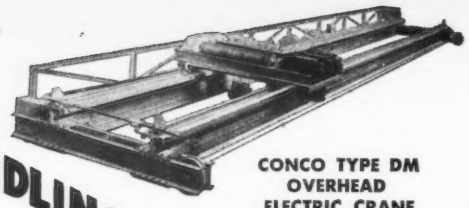

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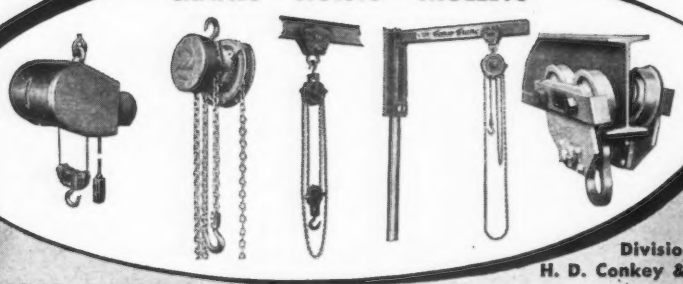

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10,000 TRADE NAMES

electrode. American Manganese Steel Co., 390 East 14th St., Chicago Heights, Ill.

E. C. N. Alloy: Heat and corrosion-resistant nickel-chrome iron for case-hardening boxes, glass molds, muffles, pumps. Sutcliffe, Speakman & Co., Leigh, Lancashire, England.

Edco: Phosphor-bronze welding rods. Eccles & Davies Machinery Co., Inc., 1910 Santa Fe Ave., Los Angeles 21.

Edelbronze: Bronze for use in the chemical and textile industries. Eisenwerk Neubrandenburg G.m.b.H., Berlin, 20, Germany.

Edge Hill: Natural rock refractory, used for bessemer converters and cupolas. Edge Hill Lilica Rock Co., Fort Washington, Montgomery Co., Pa.

Edison: Nickel-iron-alkaline types of storage batteries. Thomas A. Edison, Inc., West Orange, N. J.

Edison Electric Cap Lamps: Strong, directed, safe illumination for miners. Mine Safe Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh.

Edgeohm: Resistor consisting of a resistance alloy ribbon wound on edge in an oval form. Ward Leonard, 31 South St., Mt. Vernon, N. Y.

Eel-Skid Oil: Lubricating oil for elevating screw and under capstan wheel nut for Rockwell hardness tester. Wilson Mechanical Instrument Co., 383 Concord Ave., New York 54.

Eel Slip: Bearing materials. Johns-Manville, 24 E. 40th St., New York 16.

EF: Electric and fuel-fired industrial furnaces for annealing, brazing and various other heat-treating processes. Electric Furnace Co., Salem, Ohio.

Efco: All kinds of electric furnaces for melting or heat treating metals. Electric Furnace Co. Ltd., Weybridge, Surrey, England.

Efco Quick-Braze: For use in copper-brazing operations where wire or strip filling materials are not convenient. Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England.

88 X: Nonmagnetic alloy for high strength; mildly corrosion resistant. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22

Elalco: See Calido.

Elastic: High gold-platinum alloy with Cu-Ag-Zn; for wire clasps, tooth crowns, pinlays. J. M. Ney Co., 9 Elm St., Hartford.

Elastikraft: Watercreped, single stretch kraft paper for bag linings, barrel linings, covers, other bulk packaging or wrapping applications. Cincinnati Industries, Inc., Cincinnati (Lockland).

Elastuf: Group of related steels, sold in the machinable condition, ready for use physical properties. Brown-Wales Co., 493 C St., Boston 10.

Elastuf: Special analyses of carbon, chrome-vanadium, chrome-moly and chrome-nickel-moly steels, hot rolled, cold-finished or precision finished, characterized by high strength, excellent machinability and freedom from distortion. Horace T. Potts Co., Erie Ave. and D St., Philadelphia 34.

Elastuf 44: Cr-Ni-Mo steel with uniform cross-sectional hardness of 44 to 46 Rc. For

(CONTINUED ON PAGE 145)

Information Free

(1) Self-Fluxing Solder:

Tri-Core, a self-fluxing solder with three cores located just beneath the outer surface of the wire, is described in this folder. This new solder is said to assure a continuity of flux flow as empty flux sections are precluded, as well as to permit use of lower tin content solders. *Alpha Metals, Inc.*

(2) Electronic Heaters:

Use of industrial electronic heat generators for preheating and sealing of plastic rubber, plywood and other dielectric materials is presented in bulletin 7005. Applications of equipment are discussed and types of standard Thermatron electronic generators complete with ovens and presses are described. *Radio Receptor Co., Inc.*

(3) Industrial Goggles:

Illustrated descriptions of eight basic spectacle-type goggle designs, which offer over 500 lens, sideshield and frame combinations are contained in catalog No. AWP-50. Price list enables easy determination of the type and price of goggle required. *Eastern Equipment Co.*

(4) Electric Cable Hoists:

Pamphlet outlines design features of Bob-Cat electric cable hoists, having capacities of 1000, 2000, 3000 and 4000 lb and lift speeds of 22 fpm on the 1-ton model and 41 fpm on ½-ton size. Cross sections are shown; tables give specifications and prices. *Lisbon Hoist & Crane Co.*

(5) Crane Controllers:

Bulletin 930 discusses frequency relay magnetic control for ac wound motor, motor-operated cranes, including accelerating operations encountered in dynamic lowering control for the hoist motion and reversing-plugging control for bridge and trolley motions. Duplex, triplex and quadruplex controllers for 2, 3 and 4-motor drives on these motions are also included. *Electric Controller & Mfg. Co.*

(6) Hydraulic Pipe Bender:

Bulletin A-7 gives details of construction features, capacity and maintenance of portable hydraulic pipe bender, stressing developments which make on the spot cold bending possible. A chart of radii of bends to center line of pipe is included. *Watson-Stillman Co.*

(7) Electric Control Devices:

Bulletin No. 100,000 contains information and illustrations of various electric control devices, including ac and dc motor starters, speed and voltage regulators, resistors, ring and plate rheostats, switches, magnetic contactors, relays and dimmers. *Ward Leonard Electric Co.*

(8) Perforated Metals:

Perforated metals, screens and fabricated metal products are featured in catalog 46. Full size illustrations are shown of 390 shapes and sizes of openings of perforated metals, ranging from 0.023 in. diam with 400 holes psi, to perforations 8½ in. diam. *Hendrick Mfg. Co.*

(9) Pressure Reducing Valves:

Illustrated bulletin 461 gives engineering, operating and maintenance data on pressure reducing, overflow and differential valves for steam, air or gas services. Cross sectional and external views are shown and tables list pressure ranges, sizes and capacities. *Leslie Co.*

(10) Steel Analysis Tables:

Simplified tables showing the chemical analysis of basic openhearth and acid bessemer carbon and sulfurized carbon steels for cold-finished bars, and openhearth and electric furnace alloy sheets are contained in circular. *Mercantile Metal & Ore Corp.*

(11) Hydraulic Lift Truck:

Battery powered high-lift telescopic tilting fork truck, Model 200, with front wheel drive, rear wheel steer, center control and 2000 lb capacity, is fully illustrated in pamphlet. Forks can be raised to a height of 108 in. Model 300 with 3000 lb. capacity, and Model 400 with 4000 lb capacity are also described. *Wright Hibbard Industrial Electric Truck Co., Inc.*

(12) Atmospheric Risers:

Bulletin No. 246-R answers questions about atmospheric risers and their application to Isocast steel castings, such as, how "shrinks" can be avoided, what types of risers are used, how risers are kept open, and others. The proper use of these risers are said to give an effective, economical method of producing sound castings. *Empire Steel Castings, Inc.*

(13) Polishing Wheels:

Soft rubber bonded abrasive material in shape of wheels, blocks or sticks, is used for polishing metals and plastics as discussed in booklet. Three colors were selected to identify standard types of wheels: Red, for Bonds A and E; green, harder for finer finishes; black, tougher to resist heat and abrasion, for burnished finish and high polish. *General Grinding Wheel Corp.*

(14) Induction Furnaces:

Small, 3 and 6-kw spark-gap converters, used for variety of induction heating, brazing, hardening and melting applications are described in Bulletin 12-A. With a graphite assembly, temperatures of about 4500° F can be attained. Heating coils and melting furnaces for use with small converters are included. *Ajax Electrothermic Corp.*

(15) Lift Truck:

Transtacker, high-lift tiering unit, which moves, lifts and stacks material electrically, is covered in this brochure. Sketches and photographs showing operation and construction of four models as well as dimensional specifications, weights and load capacities are given. *Automatic Transportation Co.*

(16) Micarta Fabric Bearings:

Booklet B-3776 uses performance curves and tables to describe and compare four grades of Micarta fabric base bearings which are said to have been successfully applied to rod mills, merchant mills, strip mills, bar and billet mills, structural and roll mills and other reversing mills. Recommended applications of each grade are listed. *Westinghouse Electric Corp.*

(17) Fasteners:

Series of articles contained in pamphlet Vol. 3, No. 4, discusses the importance of bolts, nuts, rivets and screws in industry. Title of papers are: "Riveted Subway Gratings and Decking," "Draw Up Those Flange Bolts More Uniformly," "Revised Specifications for Structural Steel Buildings" and "What Happens When a Bolt Is Twisted Off?" *American Institute of Bolt, Nut and Rivet Manufacturers.*

(18) Metal Packings:

Descriptions of various annular and split types of metal case packings for industrial application are presented in illustrated folder, which also outlines advantages of outside and inside case packings made to fit standard stuffing boxes. Design of rings accomplishes a complete seal with three segments. *France Packing Co.*

(19) Gage Steel:

Folder tells why Graph-Mo steel, which is free machining and nonscuffing, has excellent response to heat treatment and resists wear, is suitable for gage manufacture. Available stocks and sizes are listed. *Steel & Tube Div., Timken Roller Bearing Co.*

NOTICE TO READERS: Offer limited to two months from date of issue.

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(20) New Trigatron Circuit:

New circuit of induction heating using electronic pulse method of generation, is shown in pamphlet. Depth to which heat penetrates and area heated, can be effectively controlled and localized. All controls are behind locked doors except operational switches which are centrally located. Output frequency is approximately 500,000 cycles per sec. *Gordon Electronics, Inc.*

(21) Laboratory Apparatus:

Bulletin 76A contains all types of metallurgical laboratory apparatus for rapid and accurate analysis of metals in industrial laboratories. Photelometer, designed for determining amounts of substances in solutions in chemical analysis, is featured along with carbon and sulphur determinators, high temperature (3000°F) combustion furnace and others. *Central Scientific Co.*

(22) Resistance Welding:

Bulletin No. 68A shows in diagrammatical and chart form varying uses of Ampcoloy resistance welding electrodes and alloys. Six thousand spot welds per hour using Ampcoloy spot welder tips are said to have been produced. Properties of welding alloys are discussed and their application to 90° and 30° offset water cooled holders and other products are recommended. *Ampco Metal, Inc.*

(23) Portable Cranes:

Made in eight different sizes from 1 to 3 ton capacity, modern portable floor crane can be used by one man as crane, hoist, shop truck or portable ladder. Booklet includes chart and illustrations of crane's purposes and applications, such as storing and tiering. *Canton Div., Hill Acme Co.*

(24) Meehanite Metal:

Type GA Meehanite contains finely dispersed graphite, has no interlocking structure, and withstands steam, oil and water pressure up to 5000 psi, as illustrated in Bulletin No. 10. Meehanite process is said to make possible complete and accurate control of the quantity and form of graphite as well as structural constitution of the matrix. *Meehanite Metal Corp.*

(25) Silicon Pig Iron:

In charging the cupola and blocking the openhearth heat, the desired amount of silicon can be added through the use of Keokuk Electro-Silvery, a high silicon pig iron, cast in 30 and 60-lb pig and 12½-lb piglets, as discussed in book. Its applications are completely illustrated. *Keokuk Electro-Metals Co.*

(26) Truck Loading:

Fork lift truck, small enough to maneuver easily in loading areas of highway trucks and trailers and capable of carrying loads up to 1000 lb, is described in illustrated booklet. Handling of motors, machines, tools and other materials is discussed. *Clark Tructractor Div., Clark Equipment Co.,*

(27) Rotary Files:

Bulletin R-116 entitled "Choosing and Using Rotary Files," discusses uses of hand cut rotary files and ground burs, explains their construction and analyzes their advantages. Methods of using these power tools and recommended speeds are given. *Nicholson File Co.*

(28) Precision Gages:

Steel, chrome plated, tungsten carbide and Norbide precision gages, including plug, ring and snap types, are illustrated in pamphlet. Surface finish, accuracy and wear resistance are stressed. Line of jigs, fixtures and noncutting tools is also included. *Sturdy Tool & Gage Co.*

(29) Hydraulic Fittings:

Manufacturing facilities to produce a line of fittings for hydraulic and lubricating systems and for lines which carry coolants for refrigeration and air conditioning are shown in illustrated brochure. Historical resumé of the company and its policies are also presented. *Weatherhead Co.*

(30) Plastics:

"Ready Reference for Plastics," containing brief description of the commonly used plastics and their origin, has been compiled for the guidance of engineers and buyers. Tables and data help show relative position of one kind of plastic to another. *Boonton Molding Co.*

(31) Press Welders:

Type ENB press welders for spot and projection welding, featuring roller antifriction welding head, tap switches connected to the transformer without flexing primary leads, side-mounted electrical controls, knee construction and transformer design of "damage-resisting" construction are described in bulletin No. 3-113. *Taylor-Winfield Corp.*

(32) Conveyor Belts:

Belts for conveying and treatment of industrial products and their applications in various industries are described and illustrated in catalog. Belt construction, choice of material, specifications, high temperature belts, conveyor design, installation and operation are discussed. *Cambridge Wire Cloth Co.*

(33) Milling Machine Tools:

Catalog No. C10C lists and illustrates a complete line of arbors, cutters, vises, high speed attachments, a center scope and miscellaneous accessories, giving specifications and prices. *Kearney & Trecker Products Corp.*

(34) Pipe Fittings:

Chart covering pipe and fitting materials, gives ASTM specifications, chemistry, service temperature limits and welding data on carbon, intermediate alloys, stainless and special analysis steels. *Tube Turns, Inc.*

(35) Heat Treating:

Comprehensive booklet on heat treating covers steel specifications; characteristics and applications of S.A.E.'s; heat treating practice; types of furnaces, including atmospheres and capacity; pertinent miscellaneous data. *Sunbeam Stewart Industrial Furnace Div.*

(36) Thread Gages:

Illustrated catalog lists working and setting gages, with sizes in stock, their threads, price, pitch diameters. Depicted also are special thread plug, ring and concentricity gages made to customer's specifications. *Cadillac Gage Co.*

(37) Flash-Butt Welding:

Bulletin 130-A is devoted to flash-butt welding machines for mild steels, alloy steels, aluminum and other nonferrous metals and alloys. Outlines principles, analysis, characteristics, advantages, etc., of flash welding. Typical installations are depicted. *Sciaky Bros., Inc.*

(38) Industrial Fabrication:

Illustrated folder describes services offered by Fab-Weld in unusual flame cutting, stamping and forming, jig welding, accuracy in assembly. *Fab-Weld Corp.*

(39) Diecasting:

Leaflet announces and illustrates the firm's small parts diecasting machine said to be a high speed, low cost machine featuring prefabricated die sets. Catalog and technical literature are available. *DCMT Sales Corp.*

(40) Carbide Drills:

Folder gives specifications and illustrates new series of solid carbide and carbide tipped twist drills. Drills are recommended for drilling abrasive materials such as plastics, nonferrous metals, etc., where high wear resistance is essential and risk of breakage low. *Super Tool Co.*

(41) Safety in Welding:

Pocket-sized, 24-page manual of safety precautions and rules governing the operation and handling of oxyacetylene and arc equipment for welding and cutting. Describes and illustrates care to be exercised when using gas cylinders, torches and regulators, hose lines and generators. Prevention of backfires and flashbacks, welding of tanks, containers and pipelines are also discussed. *Air Reduction Sales Co.*

(42) Carburizing Furnaces:

Bulletin describes controlled-atmosphere gas carburizing process and outlines its inherent advantages. Company's procedure of designing each furnace to suit specific applications is discussed and typical installations are illustrated. *Holcroft & Co.*

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gears, worms, pinions, gudgeons, short shafts for high torque and wear resistance. Horace T. Potts Co., 501 E. Erie Ave., Philadelphia.

Elastuf Media: See Elastuf.

Elastuf Penn: See Elastuf.

Elcomet: Corrosion and abrasion-resistant nickel-chrome-iron alloys with Si-Cu-Mo-Mn; for valves and pumps. LaBour Co., 1563 Sterling Ave., Elkhart, Ind.

Elcomet K: Nickel-chrome iron alloy with Si-Cu-Mo-Mn-C for spinner heads, valves, pumps. LaBour Co., 1563 Sterling Ave., Elkhart, Ind.

Electrical: Silicon-iron magnetic core material; high physical strength, high density magnetic permeability. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Electrical Sheets: Complete line of silicon-steel sheets for electric motors, generators, and other such applications. Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh 30.

Electric-Abrasive: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

Electric Furnace: First quality stiff-mud firebrick. Chicago Fire Brick Co., 1467 Elston Ave., Chicago 22.

Electrichek: Comparator or gaging head utilizing the reed mechanism to make and break electrical contacts. Sheffield Corp., Box 893, Dayton 1.

Electrifugal: Compact pumps ranging in capacity from 15 to 1600 g p m. Allis-Chalmers, Milwaukee 1.

Electrifugal: Pumping units. Allis-Chalmers Mfg. Co., Milwaukee 1.

Electrigage: Electrical type of gaging head used on Sheffield internal and external measuring instruments. Sheffield Corp., Box 893, Dayton 1.

Electro: High-speed abrasive cut-off wheels. Electro Refractories & Alloys Corp., 344 Delaware Ave., Buffalo 2.

Electro-Bonded: Zinc, steel, brass, copper, aluminum or tinplate plated with nickel, chromium, brass or copper; in sheets or coils. American Nickeloid Co., 8 Second St., Peru, Ill.

Electro-Chemograph: Recorders. Leeds & Northrup Co., 4945 Stenton Ave., Philadelphia 44.

Electro Cutting Oils: Sulphurized mineral cutting oils for certain types of machining operations on steel. Gulf Oil Corp., Gulf Bldg., Pittsburgh.

Electro-Ebonol: Electro-blackening process; for aluminum, steel, stainless steel, zinc, cadmium, nickel, silver, gold, lead, tin etc. Enthone Co. Inc., 442 Elm St., New Haven 11, Conn.

Electro-Jetal: Electro-blackening process for copper or copper plate; surface readily absorbs oil, wax or lacquer. Alrose Chemicals Co., Cranston, R. I.

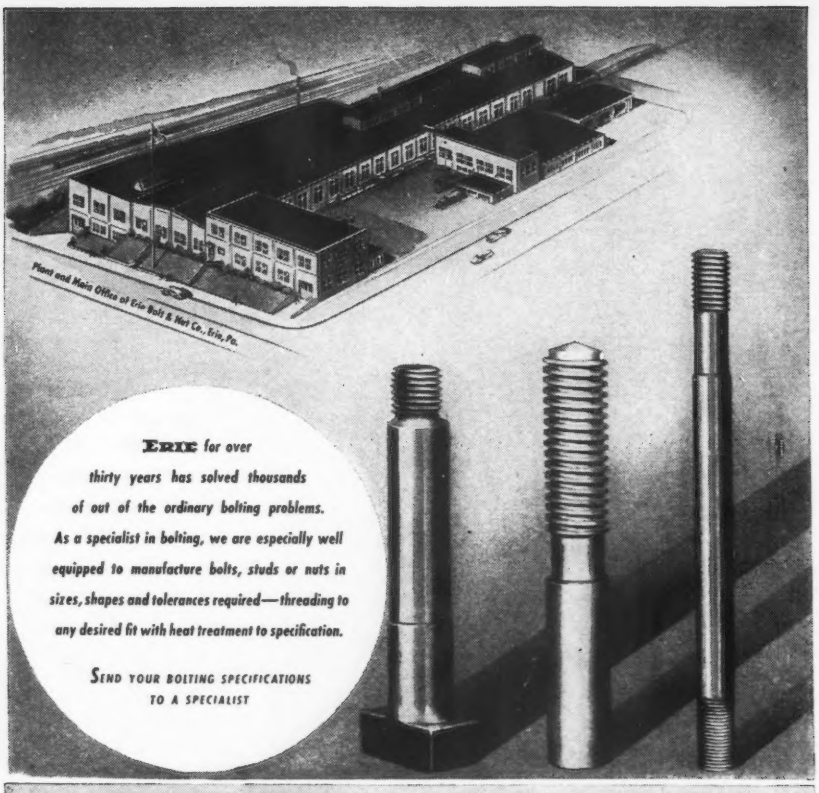
Electro Lift: Hoists and cranes. Electro Lift, Inc., 32 Church St., New York.

Electrobestos: Heat-resistant materials. Johns-Manville, 24 E. 40th St., New York 16.

Electrocast: Refractories and refractory cements for metallurgical, melting, enamel

NO PILOTS NEEDED: *Radar, radio, television and various devices sensitive to sound, heat and magnetism are among the methods the Navy is working with for directing pilotless aircraft. This scene shows guided missiles under construction at the Naval Air Modifications Unit, Johnsville, Pa., near Philadelphia.*

ALUMINUM BOOM: *Typical of the aluminum products which went into housing in increasing quantities during the past year are these corrugated aluminum sheets. This scene shows the sheet being corrugated at a Reynolds Metals plant which company alone supplied more than 1 million lb a day for this purpose.*



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5 SHERMAN STREET WORCESTER (1) MASS.

10,000 TRADE NAMES

frit furnaces, etc.; electrolytic cells, etc. Corhart Refractories Co., Inc., Sixteenth and Lee Sts., Louisville 10, Ky.

Electrocolor: Articles finished by electrolytic color plating which deposits a film of cuprous oxide producing a wide variety of colors by means of light interference. United Chromium, Inc., 51 E. 42nd St., New York 17.

Electrodize: A.C. anodic coatings on aluminum and its alloys; abrasion resistant and a paint base. Colonial Alloys Co., P.R.R. & Trenton Ave., Philadelphia.

Electroflo: Automatic gas pressure and temperature controllers for gas-fired furnaces; also pyrometers. Electroflo Meters Co. Ltd, Abbey Road, Park Royal, London, N.W. 10, England.

Electrofluid: Hydraulic drives. Link-Belt Co., 2047 W. Hunting Park Ave., Philadelphia 40.

Electroflux: Magnetic crack detector for ferromagnetic materials. Metropolitan-Vickers Electrical Co., Ltd., Trappord Park, Manchester 17, England.

Electrofluid: Motorized hydraulic combination up to 20 hp; smooth, cushioned starting. Link-Belt Co., 521 N. Holmes St., Indianapolis 6.

Electro-Lift: Monorail hoists and cranes. Electro Lift, Inc., 30 Church St., New York 7.

Electrolytic-Nickel Cathodes: 99.95 pct (including cobalt) for alloying ferrous and nonferrous metals, electroplating, chemicals, etc. International Nickel Co., Inc., 67 Wall St., New York 5.

Electromatic: Oil-tempered spring wire for brake springs, clutch springs, airplane construction, farm machinery, etc. Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30.

Electromet: Metals and ferroalloys of boron, calcium, chromium, columbium, manganese, silicon, titanium, tungsten, vanadium, and zirconium. Electro Metallurgical Co., 30 E. 42nd St., New York 17.

Electron: Series of magnesium alloys with Al-Zn-Mn; for airplane wheels, extrusions, stampings. I.G. Farbenindustrie A.G., Abteilung Elektronmetall, Frankfurt a.M., Germany.

Electron: Magnesium alloy with Al-Cu-Zn-Mn-Cd-Si for automotive, electrical, textile and aircraft industries. Chemische Fabrik Griesheim Electron Co., Frankfurt, Germany.

Electronic Bronze: Bronze for springs, contacts, diaphragms. Western Cartridge Co., East Alton, Ill.

Electronic Tornado: Automatic carbon-arc process for welding thin materials and nonferrous materials. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

Electronik: Potentiometers. Brown Instrument Co., 4498 Wayne Ave., Philadelphia 44.

Electrotemp: Temperature indicators: Westinghouse Electric Corp., East Pittsburgh, Pa.

Electrox: Dry-disk rectifiers, battery chargers, battery eliminators for various d.c. applications. Schauer Machine Co., 2060 Reading Rd., Cincinnati 2.

Electrunite: Plain steel welded tubes for boil-

10,000 TRADE NAMES

ers. Republic Steel Corp., Republic Bldg., Cleveland.

Electrunite: Electric welded steel tubing. Steel & Tubes Div., Republic Steel Corp., 220 E. 131 St., Cleveland 8.

Elektrobronze: Copper alloy with 10 Al, Mn-Fe, for valve gage fittings. Ostermann & Co. Metallwerke, Cologne, Germany.

Elektron: Magnesium alloy with 8 Al, Zn-Mn for propellers and forgings in extrusions. Jas. Booth & Co., Ltd., Birmingham, England.

Elephant Brand Phosphor Bronze: Series of bronzes with 0.3-0.5 P, for tough machinery parts, pinions, piston rods, valves, bearings under extreme pressures. Phosphor Bronze Smelting Co., 2200 Washington Ave., Philadelphia.

Elfur Iron: Complex alloy cast irons with Si-Mn-Ni-Cr; for turbine castings, liners, pistons, dies, brakedrums. Cramp Brass & Iron Foundries, Eddystone, Philadelphia.

Elfurno: Generators for producing special protective atmospheres in electric and fuel-fired controlled atmosphere furnaces. Electric Furnace Co., Salem, Ohio.

Elinvar: Fe-Ni-Cr alloy with constant modulus of elasticity; for thermostats and metal-to-glass sealing. Crucible Steel Co., Chrysler Bldg., New York; Simonds Saw & Steel Co., Fitchburg, Mass.

Elinvar: Nickel-chrome stainless alloy for watches and chronometers, resistance wire hair springs. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France; R. Y. Ferner Co., 131 State St., Boston.

Eliptex: Vibrating screens. Robins Conveyors, Inc., 270 Passaic Ave., Passaic, N. J.

Elkaloy: Copper alloy for electrodes, for resistance welding of steel. P. R. Mallory Co., Inc., 3025 E. Washington Ave., Indianapolis.

Elkem: Electric rotating-arc furnace. Det Norske Akteselskab for Elektrokemisk Industri, Oslo, Norway.

Elkonite D-54: Electrical-contact alloy for heavy-duty relays. P. R. Mallory & Co., Inc., Ray F. Storrow Bldg., Indianapolis.

Elkonite: Two types of W-Cu sintered alloys which do not respond to heat treatment, used for resistance welding electrode dies, valve seats, bearing metals. P. R. Mallory Co., Inc., Mallory Bldg., Indianapolis.

Elkonium: Silver alloy for electrical contacts. P. R. Mallory Co., Inc., 3025 E. Washington Ave., Indianapolis.

Ellwood: Wire fences. American Steel & Wire Co., Cleveland 13.

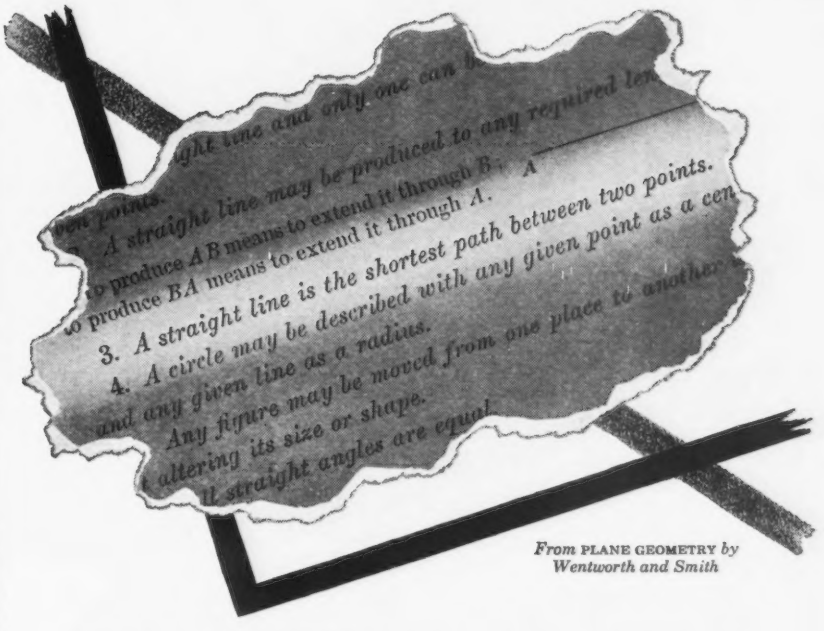
Ellwood Glidden: Barbed wire. American Steel & Wire Co., Cleveland 13.

Elmanco: Electrolytic manganese of 99.969 pct Mn. Electro Manganese Corp., Rand Tower, Minneapolis 2.

Elmira: Friction clutches. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Elray: Light soluble oil coolant especially suited for both machining and grinding operations where soft to medium-hard water is available. Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago 80.

Elrod: Aerators and elevated diffusers for sew-


A straight line may be produced to any required length.
3. A straight line is the shortest path between two points.
4. A circle may be described with any given point as a center
Any figure may be moved from one place to another
altering its size or shape.
straight angles are equal

From PLANE GEOMETRY *by Wentworth and Smith*

We Say "Get in Touch With Our Distributor"

WE'VE EXPLODED THAT "STRAIGHT LINE" THEORY

. . . It may be good geometry, but the "straight line" theory isn't good distribution.

Take an example. You want a 50-foot length of ⅜-inch steel chain. We make it in our York plant. A "straight line" would be from us to you. Just like that.

But if you had to go direct to manufacturers for all the thousand and one things you have to buy, you wouldn't have time to do anything else.

That's where our distributor comes in. He is doing his best to keep a full assortment of all the chains we make—in all the sizes you need. We're doing our best to keep him supplied. So that you can pick up your phone and get what you want—when you want it.

So the "shortest path" between our chain mill and your plant is by way of an American Chain distributor. His business is to serve you with products and up-to-the-minute technical information about them. He is responsible to you just as we are responsible to him for the quality of the products we make for your use.

We offer you the best chain and chain fittings we know how to make. And, so that it will be easier for you to buy, we say . . . "Get in touch with our distributor."

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10,000 TRADE NAMES

age treatment plants. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Elverite D: Molybdenum chilled iron with high wear resistance. Babcock & Wilcox Co., 85 Liberty St., New York 6.

Elverite: Chilled cast iron with Ni-Cr for wear-resisting parts in pulverizers, crushers, conveyors. Babcock & Wilcox Co., Barberton, Ohio.

Elverite: Wear resisting chilled cast iron with 3.8 C for tube mill linings, wheels, jaw crusher sprockets. Babcock & Wilcox Tube Co., Beaver Falls, Pa.

E. M.: Electric motor bearings. Johnson Bronze Co., 505 S. Mill St., New Castle, Pa.

Embeco: Non-shrinking grout for machine basis; rapid settling. Master Builders Co., Cleveland 3.

EM Briquets: Ferroalloys in briquet form for cupola additions of silicon, manganese, and chromium. Electro Metallurgical Co., 30 E. 42nd St., New York 17.

Emco: Hard-surfacing welding rods, special alloy castings. Eld Metal Co., Ltd., 1235 E. 63rd St., Los Angeles 1.

Emetco: Series of bearing alloys. Empire Metal Co., E. Water & Fullerton St., Syracuse, N. Y.

Emperor: Heat and corrosion-resistant Cr-Ni iron alloy for hardening boxes, furnaces, glass molds. Sutcliffe, Speakman & Co., Leigh, Lancashire, England.

Emperor Chrome Nickel Alloy: Heat-resistant high Ni-Cr iron alloy for furnace parts. Sutcliffe, Speakman & Co., Leigh, Lancashire, England.

Empire: Bolts, nuts and rivets of all types. Russell, Burdsall & Ward Bolt and Nut Co., Coraopolis, Pa.

Empire: High-chrome stainless alloy for corrosion resisting parts. Empire Steel Castings, Inc., Reading, Pa.

Empire Steel: Mild steel for screw-machine products. Crucible Steel Co. of America, Chrysler Bldg., New York.

En-ar-co: Industrial and automotive oils and greases. National Refining Co., Hanna Bldg., Cleveland 15.

Endogas: Gas generators for heat treating. Westinghouse Electric Corp., East Pittsburgh, Pa.

Endurance: Corrosion and abrasion-resistant bronzes for pumps, collars, railway bearings, connecting rod bearings. A. Cohn, Ltd., London, England.

Enduria: Plain-carbon steel for springs. Bethlehem Steel Co., Bethlehem, Pa.

Enduro: Complete series of stainless steels for corrosion and heat resistance in valves, furnace parts, and chemical applications. Republic Steel Corp., Republic Bldg., Cleveland.

Endweldur: Series of plain carbon and Ni steels for chains. American Chain & Cable Co., Bridgeport, Conn.

Enebra: Bronze for use in the chemical and textile industries. Eisenwerk Neubrandenburg G.m.b.H., Berlin 20, Germany.

Enebra Bronze: Corrosion resistant bronze for high static and dynamic loads. Eisenwerk

10,000 TRADE NAMES

Neubrandenburg G.m.b.H., Berlin 20, Germany.

Engravers Brass: Free-cutting brass for gears, watch and clock backs. Scovill Mfg. Co. Waterbury, Conn.

Ensign: Industrial X-ray film. Austin Edwards, Ltd., Warwick, England.

Enterprise: Hot-dip galvanizing. Enterprise Galvanizing Co., 2507 E. Cumberland St., Philadelphia 25.

Equalizing Bridle Sling: Wire rope sling equipped with equalizing thimble and having two or more legs for attachment to load. John A. Roebling's Sons Co., Trenton 2, N. J.

Equalizing Grommet Sling: Endless wire rope sling woven from a single piece of strand and equipped with equalizing thimbles. John A. Roebling's Sons Co., Trenton 2, N. J.

Equaload: Metal graphite brush for low voltage generator and slip ring applications. Keystone Carbon Co., St. Marys, Pa.

Equitron: Accessory for use with the Rockwell hardness tester for supporting and positioning end-quench test specimen for hardenability of steel. Wilson Mechanical Instrument Co., 383 Concord Ave., New York 54.

Era Manganese Steel: Non-magnetic Mn steel with 1.25 C for crushers, dredging machines, soldiers' helmets. Hadfields, Ltd., Sheffield, England; Midvale Co., Philadelphia, Pa.

Eraydo: Zinc with Cu and Ag for panels, electrical appliances, drawn cases. Illinois Zinc Co., 2957-2963 W. 47th St., Chicago.

Erlium: Steel rods and wire. American Steel & Wire Co., Cleveland 13.

Ermal: High-carbon Mn-Si cast iron for brake drums, wrench handles, bolts, gears. Erie Malleable Iron Co., 682 W. 12th St., Erie, Pa.

Ermalite: Cast iron with 1.8 graphitic C, Si-Ni, for brake drums. Erie Malleable Iron Co., 682 W. 12th St., Erie, Pa.

Ermeto: Steel fittings, which solve the mechanical problem of connecting tubing, without the necessity of flaring, threading, welding, or soldering. Brown-Wales Co., 493 C St., Boston 10.

E.S.C.: Series of nickel-chrome alloy steels some of which contain Mo, for highly stressed mechanical parts in airplane and automobile engines. English Steel Corp., Ltd., Sheffield, England.

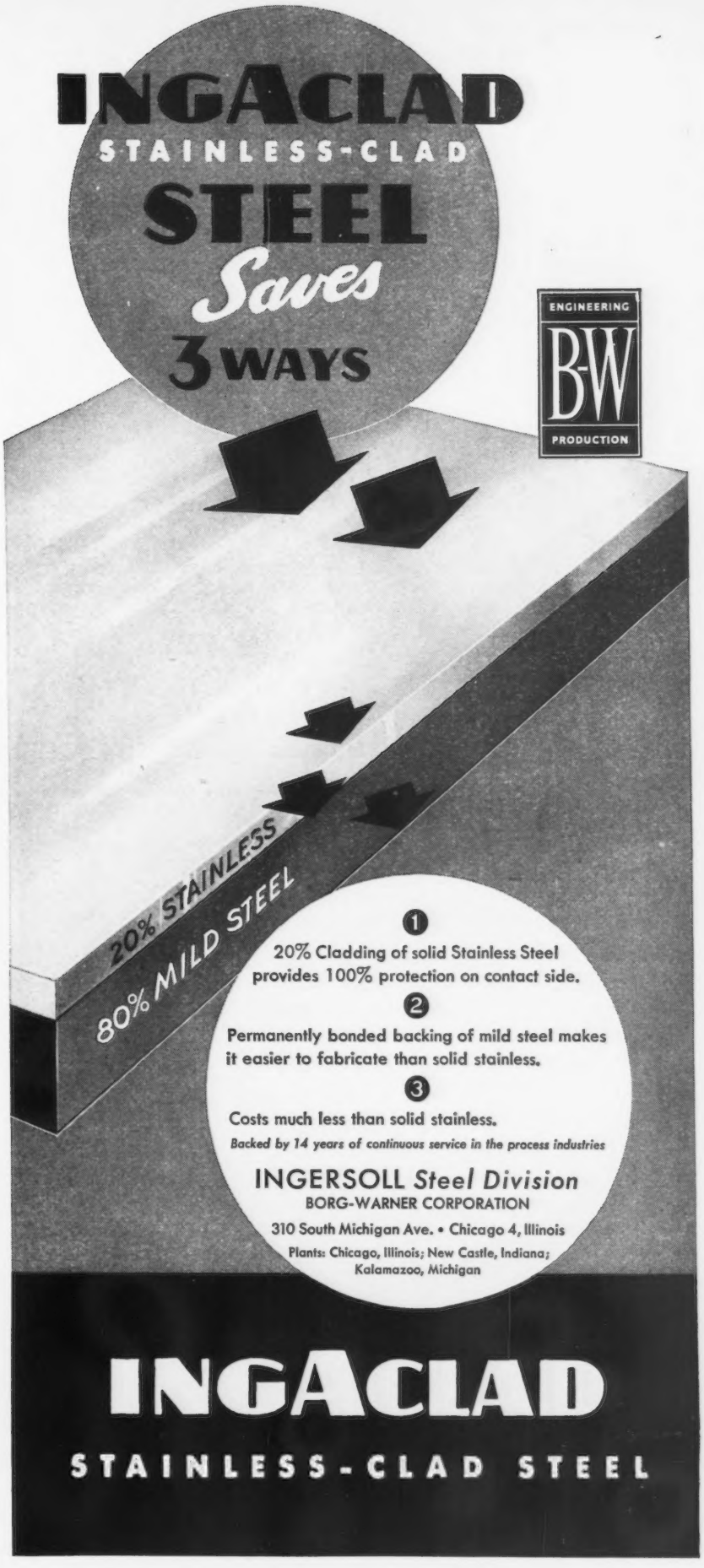
Esco Alloy: Series of austenitic chrome-nickel stainless steels for general anti-corrosion service. Electric Steel Foundry Co., 2143 N.W. 25th Ave., Portland, Ore.

Esco Stainless: Straight-chrome stainless steels for heat and corrosion resistant parts. Electric Steel Foundry Co., 2143 N.W. 25th Ave., Portland, Oregon.

E.S.B. Minor: Electrode salt bath furnaces for preheating, hardening, cyanide hardening, brazing, etc. Wild-Barfield Electric Furnaces Ltd., Watford, Herts, England.

Esco: Drafting room equipment supplies. Engineering Manufacturing Co., 321 S. Water St., Sheboygan, Wisc.

(TO BE CONTINUED IN NEXT ISSUE)



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Airless or centrifugal operating machines require Heat-Treated Shot or Heat-Treated Steel Grit.

The ordinary Shot and Grit will not do. They break down too fast and wear away quickly. In other words—expensive at any price.

Our Shot and Grit were made expressly for use in airless machines.

It simply means—

More cleaning at much less cost.
More cleaning and less dust at less cost.

And, remember—any old size won't do.

There is a correct size of Shot and Grit to obtain maximum results.

If cleaning grey iron, malleable iron, or steel drop forgings, we can save you money.

Let us prove it!

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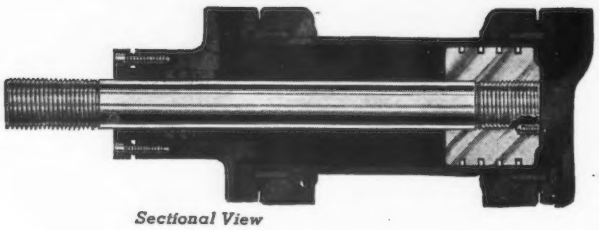
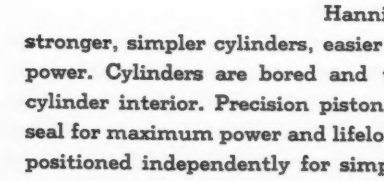
Manchester, New Hampshire



Sectional View

Precision design means better use of hydraulic power

Hannifin hydraulic cylinder design provides stronger, simpler cylinders, easier to use, for efficient use of hydraulic power. Cylinders are bored and then honed, providing mirror finish cylinder interior. Precision piston rings provide high efficiency piston seal for maximum power and lifelong service. Universal end caps may be positioned independently for simple, convenient installation. Built in seven standard mounting types, in a full range of sizes, for any length stroke. Many special types and large sizes available. Write for Cylinder Bulletin.



Model EN

Many Other Mountings Available

HANNIFIN MANUFACTURING COMPANY
Chicago 24, Illinois

Gallup Polls

(CONTINUED FROM PAGE 109)

hower, the attitude of veterans might change materially.

(6)—Among labor union members Stassen is stronger than any Republican candidate except Dewey, although the latter leads in that group by a wide margin.

(7)—Stassen's appeal to white collar workers and farmers is almost as strong as his appeal to business and professional people. Among occupation groups he is weakest at present with manual workers.

(8)—By education level, he is stronger with people who have had some college training than with people who only had a grade or high school education.

In more than 10 yr of polling the public on candidates for presidential nominations the institute has found that there can be wide fluctuations in popularity in a short space of time. The race is never closed until the actual nomination is made.

Sometimes, as in 1940, a man comparatively unknown a year before nominations suddenly leaps into the limelight and leads the list in popularity.

Wendell Willkie was not even mentioned by Republican voters polled by the institute a year before the 1940 Republican convention. Yet in the final weeks his popularity outstripped that of men who had been leading or widely mentioned for many months.

London Economist

(CONTINUED FROM PAGE 115)

Greek, Latin and the Bible to give them not only a common basis of reference in literature, but also in the theory and practice of government. But as early as 1900 classical education had become too rigid, too removed from the realities of a burgeoning industrialism. Under the leadership of the then president of Harvard, who greatly admired German thoroughness, it was tossed out of the window in favor of a departmentalizing of knowledge and a new eclecticism which filtered down through the school system and fattened on the new psychology.

At the top this produced men intensively trained in one field and in-

tensely ignorant of others. At the bottom, it resulted in a rash of experimental and progressive schools which had little in common beside a belief in the ultimate genius of a child if unhampered by any discipline and untainted by any contact with the hard-earned wisdom of elders.

"Papa knows all," said the Victorians, and set out for adventure. "Papa knows nothing," said the children of the Edwardians, and proceeded to set up within the state artificial substitutes for the home-made disciplines and security which their parents had carefully abolished so as not to interfere with their free development according to the newer gospels.

Into this welter of conflicting indisciplines came the further disintegrating forces of Fascist and Communist ideas. Fascism attracted the timid rich, communism offered new pie in the sky for those underprivileged in income or idealism. Its fashionable period coincided with the early days of the New Deal. Since then it has waxed and waned, undermining democratic disciplines in the name of Communist freedom, trying to hide the obvious fact that Communist disciplines are far harsher than those which democracy would tolerate.

"Thus," as the young Clemenceau observed here after another war, "on every hand political and social difficulties arise. But the people of the United States have a peculiar faculty for adjusting themselves to circumstances and learning by experience, suddenly changing their course and thus nearly always disappointing prophets of disaster."

What is happening now is a new change of course, the start of another attempt to remake American democracy in terms of a new age. The strains of increasing industrialism, growth of labor factionalism, the continual dislocation caused by strikes, the contact in international affairs with men trained in other kinds of disciplines, have made Americans newly aware of what they prefer to forget—that democracy on the American pattern is not the chosen form of government in the rest of the world, and that if it is to survive it must not only satisfy its citizens, but prove itself capable of standing against outside competition.

The reorganization of Congress

A PICKLE ROOM BOTTLENECK REMOVED!

BY A NEW WYANDOTTE DEVELOPMENT...

A heavy-duty cleaner, Wyandotte Porenac* is specifically designed to eliminate the cleaning bottlenecks common to every pickle room of porcelain enameling plants.

This balanced formulation takes care of the toughest mineral oil drawing compound with speed and certainty.

Wyandotte Porenac is economical, too. Its superior emulsifying action eliminates the necessity for pre-cleaning and sharply decreases cleaning time. Its concentration requirements are low. Additions are at a minimum and life of solution is remarkably long.

Wyandotte Porenac has been field-tested with excellent results, showing its ability to clean tough drawing compounds, regardless of shop or water conditions.

In addition to cleaning prior to porcelain enameling, Wyandotte Porenac is of such versatility that it probably can be adapted to your specific problem, whether it be cleaning prior to barrel-plating or oxide finishing or other heavy-duty cleaning operations.

Let your Wyandotte Service Representative demonstrate for you the remarkable qualities of Wyandotte Porenac. All you have to do is give him a call.

* Temporarily in short supply.

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WYANDOTTE CHEMICALS CORPORATION

Wyandotte, Michigan

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MATERIALS • METHODS • SERVICE

last year, which is annoying the advance guards of the new Republican Congress because it has cut down the number of committees and hence the number of chairmanships to be distributed to the faithful, is one evidence of progress. The kind of questioning aroused by the coal strike is another. The crisis passed, but there is widespread realization that the intervention of the law as invoked by the government was a step backward and that other disciplines and other mechanisms must be marshalled for the future lest the courts be tried too far.

Two other lines of procedure start further back, but in the future may prove more far-reaching. One is the new emphasis on the need for increased support for the social sciences so as to counterbalance overemphasis on the physical sciences. The other is the quiet revolution that seems to be taking place in higher education.

The latest report of the Carnegie Foundation reflects a "concern with helping the public to appreciate the American heritage and to recognize its responsibilities toward making democracy keep pace with rapid social and economic change."

It also intends to "offer help in making this country more literate and more emotionally mature in international affairs," thus suggesting that economic illiteracy and emotional immaturity may not be limited to the ranks of labor leaders, radio fans and schoolgirls.

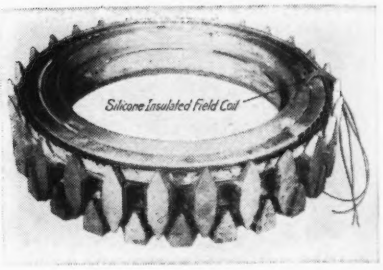
The president of the Rockefeller Foundation, discussing possible Congressional support of research into the physical sciences, said "What we really need is a mastery of man's social nature . . . knowledge and more knowledge of the onrushing consequences of our machines, consequences which, because they are too intricate, are shaping our lives."

During the war the colleges, while speeding up existing courses, were making quiet inquiries in preparation for an overhauling of their basic purposes. The University of California questioned 47 colleges about the changes they planned to make after the war, and found the great majority intent on increasing emphasis on general education at the expense of specialization, increasing the number of courses required as opposed to the number which could be freely chosen.

Silicone News

DC SILICONES

DC Silicone Insulation Extends Life of Electro-magnetic Brake



PHOTO, COURTESY DYNAMATIC CORPORATION, SUBSIDIARY OF EATON MANUFACTURING COMPANY

Protects water cooled field coil in this magnetic field member.

In producing electro-magnetic brakes for well drilling rigs, the Dynamatic Corporation, of Kenosha, Wisconsin, tested and adopted DC Silicone Insulation. Moisture infiltration limited the life of coils treated with organic varnishes. Protected by DC 996, none of these coils has failed.

These brakes exert a variable and controllable retarding effect without friction or wearing parts. Fundamentally, they involve the rotation of an iron drum through a variable magnetic field created by stationary coils inside the drum. Eddy currents generated in the rotating drum exert on the rotor a torque which varies with the amount of current admitted to the field coils.

A heavy duty model absorbs up to 5,000 horsepower, providing speeds from 800 r.p.m. down to a rate that permits the setting of slips on the heaviest strings of drill pipe.

The permanently sealed field coils are cooled by water circulating over the field casting and eddy current members. But DC 996 excludes moisture indefinitely even at high operating temperatures. Insulation resistance remains high despite long exposure to weather when a rig is idle. And, when drilling is resumed, this resistance rises rapidly and soon reaches infinity.

DC 996 is described in leaflet No. S 3-4.

NOTE: See our Exhibit at the Electrical Engineering Exposition, New York, January 27 to 31.

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